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**Food and Agriculture Organization
of the United Nations**

REPORT OF THE RICE STUDY GROUP

Trivandrum, Travancore State, India

16 May — 6 June 1947

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*Dilkush, Trivandrum,
Travancore State*

6th June 1947

Sir John Boyd Orr, Director-General
Food and Agriculture Organization of the United Nations,
Washington D. C.

Sir,

We have the honour to present this report of the Rice Study Group constituted by FAO in pursuance of the recommendation made in paragraph 154 in the report of the Preparatory Commission on World Food Proposals. The Study Group commenced its work at Trivandrum on the 16th of May and concluded on the 6th of June 1947. It held two plenary sessions, one at the beginning during which members were accorded an opportunity to offer general remarks and one at the end during which the report was considered. In the interval the Group formed itself into three committees dealing respectively with production, internal storage and distribution, and international problems connected with rice.

The Study Group has felt on the one hand the need for early action and on the other the more or less utter lack of data on which to formulate specific proposals which may be implemented immediately. In fact, there was a considerable body of opinion that one of the main functions of a Rice Board would be the collection, collation, and dissemination of relevant data on which intelligent co-ordination both within a country and in the international sphere could be effectively carried out. It became evident during the course of the deliberations that technical and economic problems, when discussed at policy levels, involved commitments that could be made only with specific mandates from the respective governments, and that before the recommendations of the Study Group can be translated into practice they require consideration at government levels at the earliest possible opportunity.

Any defects in the report must be attributed neither to lack of diligence nor lack of will but to the shortness of the time within which the work had to be completed, and the paucity of data which is a feature of the rice economy at the present time. Where more than one opinion had been expressed on a subject, we have attempted to record each faithfully.

We have not attempted to frame a seriatim agenda for a rice conference. We have felt that the report of the Study Group as a whole, together with the specific recommendations made in the body of the report, will form a suitable agenda for a rice conference at government level. However, for the sake of convenience, we point out that the main agenda of the conference should be as follows:

(1) Whether an international organization should be formed and if so: (a) its composition, (b) its function, (c) its location, (d) its staff.

(2) Action to be taken on the recommendations of the Rice Study Group in regard to the rice problem in all its aspects.

We desire to place on record our great appreciation of the work done by the Secretary-General and his staff in the face of several adverse circumstances, and especially the shortness of the time at their disposal.

S. Y. KRISHNASWAMY
Chairman, Rice Study Group

Contents

<i>Chapter I.</i> NEED FOR INTERNATIONAL ACTION	1
Nature of the Proposed International Organization	4
<i>Chapter II.</i> PRODUCTION TRENDS AND POTENTIALITIES	7
Prewar Production	7
Present Production and Future Trends	7
Land Development and Reclamation	11
Likely Deficits and Surpluses in the Future	12
<i>Chapter III.</i> CONSERVATION OF AVAILABLE SUPPLIES	13
<i>Chapter IV.</i> CONSUMPTION AND NUTRITION	17
<i>Chapter V.</i> IMPROVEMENTS AND EXPANSION OF PRODUCTION	19
<i>Chapter VI.</i> IMPROVEMENTS IN DOMESTIC MARKETING AND DISTRIBUTION	24
Standardization of Terms	24
Standard Weights and Measures	25
Classification of Rice Varieties	25
Grading	26
Crop Forecasting and Estimating	27
Market Intelligence	31
Agricultural Census as a Basis for Crop Estimating	32
Rehabilitation and Development of Transportation System	32
Rehabilitation and Development of Rice Milling	34
Growers' Co-operatives and Other Measures to Improve Marketing and Credit	34
<i>Chapter VII.</i> PRICE POLICIES	37
National Price Policies	37
Stabilization of Internal Prices	38
Fair Prices to Consumers	39
Price Stabilization and Famine Reserves	39
International Price Agreements	39
<i>Chapter VIII.</i> INTERNATIONAL TRADE IN RICE	40
Prewar Trade	40
Postwar Situation	41
Future Prospects	41
<i>Chapter IX.</i> RESEARCH AND EXTENSION	44
Research	44
Extension Services	44
<i>Chapter X.</i> EXCHANGE OF INFORMATION	45
Supplement to the Rice Study Group Report	45
<i>Appendices</i>	
A. MEMBERS OF THE RICE STUDY GROUP	46
B. FORWARD ESTIMATES OF REQUIREMENTS AND SUPPLY OF RICE FROM SOUTH AND EAST ASIA, 1952	47
C. TABLE OF WEIGHTS AND MEASURES FOR RICE	48
D. INTERNATIONAL RESERVE STOCKS	51
E. A NOTE ON ASSURANCE OF LONG-TERM MARKETS	52
F. SUPPLEMENTARY INFORMATION	52
G. STATEMENTS BY DELEGATIONS	53

Chapter I

NEED FOR INTERNATIONAL ACTION

THE Rice Study Group has carefully examined the technical problems relating to expansion of rice production, the economic factors involved, and the aspects of the problem on which international action is desirable. These are briefly summarized in this chapter to indicate what lines of improvement may be accomplished through effective international co-operation. More detailed discussions of these problems and measures of action are contained in subsequent sections of the report.

The Group found that a great deal of work has to be done, if the rice economy of the major producing countries in South and East Asia is to be put on a permanently sound basis. Considerable research and experimental work, coupled with extension and development measures, are all necessary to obtain increased production.

Work can be started immediately by national governments on all these problems, but the great need for action on an international level on these and also on policy problems must be emphasized. International action is badly needed on such problems as the improvement and standardization of statistical and economic services, the development of suitable machinery for use in rice production, control of common pests and diseases, maximization of supplies through various measures of milling economy and prevention of waste in transit and storage, and the rehabilitation of transport in all the Southeast Asian rice-producing countries. A general world rice policy needs to be developed so that future production can be adjusted and consumers and producers can be assured of fair and stabilized prices by such methods as creating nationally held reserves, which would also ensure against famine, and developing international trade agreements.

This can be achieved only by an international organization making a continuous review of the constantly changing situation

with regard to supply and demand, market and trade conditions, transport, consumption, and nutritional requirements, and developing the necessary recommendations for co-operative action by and on behalf of member governments.

Irrigation and Drainage

The irrigation and drainage practices used on ricelands in all countries require comprehensive study so that recommendations can be made on the proper use of water to obtain maximum production of rice. Specific problems to be studied are the adequate supply of water, the time of its application, and its relation to crop production. The relative merits of supplying water on a volumetric basis as against the crop-acreage basis need to be carefully studied.¹ The economics and the relative efficiency of the two methods with regard to crop yields and their respective effects on chemical and physical structure of the soil also need intensive investigation.

Fertilizers

Comprehensive research should be undertaken on an international basis to determine the fertilizers which are most effective for growing rice. The effects of using chemical fertilizers require careful investigation, but studies should also include the effects on ricelands of applying different quantities of organic fertilizers such as green manure, farmyard manure, or composts, singly as well as in combination with concentrated fertilizers such as guano, oil cake, and bone dust. The effects on the growth of rice of combinations of chemical fertilizers and organic manures need investigation. It is also important

¹ Under the volumetric basis the farmer purchases a specified volume of water for delivery at various periods during the crop year. Water purchased on a crop acreage basis is subject to less control leading to waste of water and to the creation of drainage and alkali problems.

that attention should be given to problems connected with soil surveys, and schedules of manuring should be worked out in relation to the various complexes of soil and climate.

Cultural Practices

The effects of varying cultural practices on rice production have scarcely been studied. Some work has been carried out on transplanting techniques, such as determining the number of seedlings which should be planted in one clump and the distance which should be kept between the rows and from plant to plant. However, no clear indication is available as to the nature of the complex factors responsible for the superiority of the method of transplanting rice shoots over that of sowing seed broadcast by hand, which holds true under the varying conditions of the great areas in which rice is cultivated.

Selection and Breeding of Seeds

The production of improved seeds has received considerable attention in all countries in South and East Asia, but co-ordinated research needs to be made for selection of improved and disease-resistant seeds and for breeding high-yielding varieties. There is a great need for an international catalogue of the superior germ plasms used in the different rice-growing areas. Facilities should also be made available for the exchange of breeding stocks, new selections, or new hybrids. These two projects could be undertaken by an appropriate international organization.²

Soil Fertility

An important subject related to the production of high-yielding varieties of rice which appears to have received very little attention is the effect of the cultivation of such varieties on soil fertility. It is known that the high-yielding varieties need adequate preparatory tillage and heavy manuring if they are to give the best yields. However, it is important to find out what manuring schedules should be applied when such varieties are grown under varying soil and climate complexes; the results should be circulated amongst interested nations and

considered at international meetings of experts.

The Use and Supply of Machinery

Particular attention needs to be paid, on an international scale, to the relative merits of the different methods of preparatory tillage of ricelands under both dry and wet conditions. The increasing difficulties experienced in obtaining labor, coupled with the shortage of draft power, make it highly desirable to study the feasibility of using economical and efficient machinery to carry out preparatory tillage and harvesting.

Member governments must themselves arrange to have suitable machinery designed as speedily as possible, to fit the climatic and soil conditions in their own areas. However, there would be great advantages in pooling information on experimental designs so that standardized types of machinery could be developed for areas having more or less similar economic and climatic conditions. In order to design such machinery, member nations should employ and exchange qualified designing engineers through the medium of an international organization. Once preliminary designs have been brought out, it may be possible to interest manufacturers in undertaking mass production of such machinery to meet the estimated large demand.

It is also essential to establish a system of priority for the supply of machinery and spare parts to countries that must rehabilitate their rice-milling industry.

Control and Prevention of Pests and Diseases

The problems connected with the control and prevention of pests and diseases form another very important subject, the study of which would be made much easier by international co-operation. Most of the pests and diseases which attack rice are common to all countries in South and East Asia; this applies equally to countries in this region which have chronic deficits of rice and those which have a surplus production.

Improvement of Statistical and Economic Services

The welfare of the rice-producing and rice-consuming countries could be greatly advanced if there were adequate and accurate statistical information on which to base a program for improved rice production. In addition, the lack of information regarding the location, intensity, and extent of

² While the Rice Study Group was meeting at Trivandrum, a Subcommittee on Plant and Animal Stocks was meeting in Washington. This group recommended that FAO undertake a concise central catalogue of superior germ plasms of all varieties and types of livestock. FAO is starting work on this catalogue, which will eventually include the superior breeds of rice stocks.

food shortages in various countries has made it impossible to get relief measures under way until misery and starvation have reached critical proportions.

In some cases, notably in the storage and distribution of rice, there are several problems on which statistical information has yet to be gathered. At present, there is no intergovernmental machinery in Asia for the exchange of statistical information. Much of the available data relating to the rice economy remains to be worked out on a uniform basis. In order to compare international statistics on rice, it is necessary that each country should regularly report its statistics of production and international trade in metric tons, and of area grown to rice in hectares. Similar uniformity is required on the international use of nomenclature and standardization of the terms such as rice, raw rice, parboiled rice, husked rice, and hand-pounded rice, which are at present far from being clearly defined.

Accurate crop forecasting and estimating is the first essential of sound planning. International action will, therefore, be necessary to standardize forecasting and estimating methods by continuous study and by expert consultation and advice in respect of each rice-growing country.

Conservation of Rice and Methods of Increasing its Nutritive Value

In view of the present world shortage of rice, it is necessary to examine how far economy in dehusking and milling can be effected to minimize the shortage of this cereal. It is therefore necessary to arrange for the collection, analysis, and exchange of information regarding the extent of under-milling that is feasible and desirable, and the various methods by which rice supplies can be augmented.

The parboiling of rice is found to be useful in effecting a substantial measure of milling economy, but the process of parboiling must first be standardized. In this connection it is therefore necessary to call a meeting of nutritional experts in order to organize further studies for determining the comparative nutritive value of various types of rice produced in the different parts of the world, and recommend the most suitable method of conserving and enhancing the nutritive value of rice.

Transportation

The transportation system in several rice-producing countries still remains paralyzed.

International assistance is required to enable these countries to establish speedy and efficient transportation. For this purpose, countries in need of assistance should state their detailed requirements, through an appropriate international organization. Steps should also be taken to begin the study of the problems involved in constructing adequate new roads, railways, and waterways in Southeast Asia.

Storage of Rice

It is well known that a considerable loss of rice occurs every year due to inefficient storage. Present methods of storage leave stocks open to serious rodent and insect attack; and present control of these pests is also inadequate to prevent losses for any long period of time. Efficient methods of storage must be developed and put into practice to reduce infestation to an absolute minimum.³ The relative merits of storing unhulled rice and hulled rice should also be studied in detail.

The facilities for financing the marketing and storage of rice are generally inadequate, and special studies should be made of this subject.

Stabilization of Fair Prices and Creation of Reserves

It is generally recognized that the guarantee of a fair price to the producer is a great incentive to production. This price should not be lower than the cost of production plus a reasonable margin of profit, nor should the upper limit be beyond the consumer's purchasing power. Some kind of standard must be set up for the various countries with regard to the major elements of the cost formula. Price stabilization also raises the issue as to how far these principles can be introduced during the present period of short supply of rice, particularly in regard to the creation of reserves as a method of carrying out a price stabilization policy. Reserves are vitally necessary to ensure against famine and crop failures, and a careful study of the best location and size of these reserves should be carried out.

More information is required on the advantages and disadvantages of creating future trading in rice and this should be collected and disseminated to member gov-

³ On 4 August 1947, a meeting sponsored by FAO will take place in London on losses of all types of stored foodstuffs due to infestation. Experts from 48 member governments will consider the best methods of reducing these losses. The report will then be submitted to all member governments.

ernments. Further study is required of the long-term effect of increased purchasing power upon consumption trends. An accurate assessment of production and consumption trends can be made only through international co-operation.

It is also desirable to examine the effects upon the future demand for rice of the dietary changes brought about by the recent scarcity of this cereal.

International Allocation of Rice

An equitable international allocation of rice during the present period of short supply is a most important problem. This shortage is likely to continue for many years, the length of the period depending upon the speed of rehabilitation. Positive international action will more speedily aid recovery than any other method and help to reduce the existing shortage.

Long-Range Aspects of the Rice Shortage

The long-range aspects of the rice shortage should not be ignored. Periods of scarcity, in the past, have been followed by periods of surplus leading to disastrous slumps. To avoid these slumps it is essential to ensure that national development plans are fostered so as to raise the effective level of purchasing power on a world scale. It is also imperative to avoid adoption of the policy of restriction of production as a remedy for an economic depression.

NATURE OF THE PROPOSED INTERNATIONAL ORGANIZATION

Although the Group is in agreement that international action will be required to cope with many of the rice problems, there exist some differences in viewpoint as to the most effective means of accomplishing such actions. These are summarized below.

As regards the nature of the international organization required for rice, one view is that:

(1) for the period of short supply the present system of allocation by the International Emergency Food Council or by its successor should be continued; and

(2) for the collection, analysis, and dissemination of statistical and technical information, the activities of FAO and other existing organizations should be enlarged.

The arrangements envisaged are somewhat on the following lines. A rice sec-

tion of FAO should be constituted with a suitable secretariat to co-ordinate all work done by FAO in connection with rice, to ensure the dissemination of information, to call the attention of member nations to the problems arising from time to time, and to convene technical and other conferences. In addition to this Section, a permanent Rice Study Group or Committee should be created, representing all the important rice-producing and rice-consuming countries. Its main functions will be to conduct a continuous study of the problems of rice production, processing, and distribution. This study group should be a world body and not a regional body. A slight variant of the same proposal is that there should be a special rice secretariat at FAO Headquarters, a regional office of FAO somewhere in Southeast Asia, a rice secretariat attached to this regional office, and a rice study group consisting of the major rice-producing and rice-consuming countries of the world. The rice study group should work together with the rice secretariat of the regional office in conducting a continuous study of rice production, processing, marketing, and consumption and in making recommendations through FAO for inter-governmental action whenever and wherever it may be considered necessary.

These proposals are justified by their protagonists on the following grounds:

(1) They are opposed to the multiplication of international organizations except in case of proved present necessity. They are not, therefore, prepared to consider the establishment of an international organization for rice to meet future eventualities but only to meet present necessities. The deliberations of the Study Group have revealed present necessity in the following cases only:

- (a) allocation of rice during the period of short supply;
- (b) collection, analysis, and dissemination of statistical and technical information;
- (c) the need to keep a constant watch on a continually—and potentially rapidly—changing and developing situation in the rice trade.

(2) They desire to emphasize that these are world problems and must be dealt with on a "world scale". Rice must be regarded as a world commodity and any organization in connection with rice must be a world organization and not a regional one, although they do not, of course, rule out the

necessity for regional branches of the world organization.

(3) They also wish to record their belief that, apart from the possibility of increasing production by expansion of area or by elaborate and costly development schemes, the great hope of increased production lies outside the traditional methods of cultivation, namely in the modernization of the methods of rice production. For this reason they are anxious that the major rice-growing countries should be brought into close and permanent touch with those countries in Europe, America, and Oceania, which have applied modern technique to rice production. For this reason also, they insist that any study of rice must be a world study and not merely a regional study. They are, however, extremely doubtful of the wisdom of giving undefined executive authority to any body and must therefore oppose the grant of executive authority to any international rice organization except on the clearest proof of necessity.

The necessity of international allocation of the limited supplies of rice at present available is admitted. The organization for this allocation exists as the International Emergency Food Council, and they are convinced that this organization should continue in its present or a very similar form. The allocation of supplies has little to do with the other problems of rice. In the first place, the necessity for allocation may be temporary, whereas the other problems are permanent. In the second place, allocation of rice is intimately connected with the allocation of other foodstuffs in short supply, especially wheat. They regard it as essential that the allocation of all foodstuffs in short supply should be in the hands of a single international organization and therefore recommend that allocations should remain with the International Emergency Food Council or its successor.

According to them, the statistical and technical information services on rice and the continuous study of the rice trade situation demand a world organization, and they are satisfied that this organization should be the Food and Agriculture Organization, as these functions obviously come under Article I, paragraph 2, of FAO's Constitution.

A different view on the international rice organization is that, as 90 percent of the rice in the world is both produced and consumed in South and East Asia, it is only proper that those countries with the

greatest stake in the problem should have the major voice. Those subscribing to this view believe that a rice board consisting mainly but not wholly of all the major rice-producing and rice-consuming countries of the world should be set up in Southeast Asia to deal with all the problems concerning rice—those of an immediate character such as allocation, and those that require long-range action on production problems, processing, marketing, and distribution, both internal and international. It is envisaged that the activities of this board and those of other bodies of a similar nature will be co-ordinated with the "World Food Council," referred to by the FAO Preparatory Commission on World Food Proposals in paragraphs 251 to 256 of their report,⁴ over and above the normal co-ordination with FAO itself.

This view is supported by the following arguments: Rice is in the main an Asiatic cereal, 80 percent of the production and consumption of rice in the world taking place in Southeast Asia and over 90 percent in Asia; therefore, measures designed to increase production and consumption of rice should be discussed and decided upon in Southeast Asia itself. The men and materials necessary for the investigation into the rice problems would be most easily available on the spot. The needs in regard to rice are most keenly felt by the people in that region, and the economic conditions of the producing and consuming countries are similar. Transportation in that region would be easily arranged, and the currency problems of interchange of rice between countries in Southeast Asia could be very simply solved by prompt action on the spot. The administration of rice now lies in the hands of a body situated in Washington and dominated by countries which are little concerned with rice and which are hardly competent to deal with the subject, as compared with the countries in Southeast Asia whose whole economy revolves around rice.

It is pointed out further that the present Rice Study Group consists of nine nations, of which four come from Europe and America which produce 5 percent of the world total of rice, while the remaining five members come from Asia which produces and consumes more than 90 percent of the rice. An overdue representation has thus been given to nations whose interest is comparatively small.

⁴ FAO, *Report of the FAO Preparatory Commission on World Food Proposals*, Washington, February, 1947.

It is also pointed out that the proposal for the formation of a rice board in South-east Asia was placed before the Asian Relations Conference, recently held at Delhi, and was widely welcomed and supported by the conference. It is felt that if rice is to be discussed at a conference where all Asian countries concerned are present and speak through their own nationals as representatives of popular governments, the view held by India will be accepted. (See Appendix G, page 54.)

It has been further pointed out that rice is the one cereal which can be dealt with entirely by a single body located in the area most concerned and that it is not to the interests of countries other than those of Asia to pay the wholehearted attention that is necessary to increase production of rice in Asia.

It has also been stated that there have been several recommendations from the committees of the Rice Study Group making suggestions for action by FAO itself. FAO, however, as at present established, has no organization in Southeast Asia. The Director-General of FAO is prepared to have work done for India and China when he finds specially competent men from this region to advise him. Even then, there is no anticipation of any work being done specially for other parts of Asia. To saddle FAO today with that special work in connection with rice, is to ask the impossible. If special care and attention must be paid to rice problems in Southeast Asia, it must be done by a special body, created under the auspices of FAO and in co-ordination with commodity councils, but existing in its own right.

The discussion in the previous paragraphs

has brought out rather sharp divergences of opinion. In regard to function, one group of delegates desires the IEFC or its successor to continue to deal with the allocation of rice during the emergency period and to create an international unit within FAO for statistical and technical purposes. Another group feels that there should be a rice board to deal with all aspects. As regards structure, one group considers that the existing organizations should be used. The other section considers that, for the purposes in view, the creation of a new body working in collaboration with the existing organizations is necessary. The points on which there is general agreement are:

(1) International allocation of rice is necessary for some time to come.

(2) Continuous and co-ordinated study and research; collection, analysis, and dissemination of information; and periodic consultation are needed through the facilities of a permanent international organization.

Throughout the discussion it was found that, while these two views represented two clear-cut demarcations of opinion, most delegates entertained opinions which, especially on points of detail, would be intermediate between the two views. It is therefore decided to incorporate as appendices to this report the opinions of such delegations as desired to place their views separately on record. (See Appendix G, page 53.)

There was not much discussion regarding the powers of such an organization in relation to the member governments and other international bodies. This is correct, seeing that decisions on such matters can be taken only at the level of government plenipotentiaries.

Chapter II

PRODUCTION TRENDS AND POTENTIALITIES

THE Study Group's examination of production prospects was made under the following heads: (1) prewar production, (2) present production, (3) possibilities of increased production during the next few years, and (4) estimated future net deficits or net surpluses.

PREWAR PRODUCTION

The following figures show prewar world production in terms of milled rice:

AVERAGE FOR 1935/36 TO 1939/40 ¹

Million metric tons

<i>Asia</i>	
China	37.6
India	29.5
Japan	9.3
Indonesia	5.9
Burma	5.0
Indo-China	4.5
Siam	3.1
Korea	2.8
Philippine Islands	1.6
Formosa	1.2
Others	2.0
Total	102.5
<i>Other Regions</i>	
Africa	1.3
South America	1.2
North America	0.9
Europe	0.7

WORLD TOTAL 106.6

¹ Derived from official estimates of yield of paddy. These official figures, however, are known to be too low. The exact degree of underestimation has not been determined, but it is probable that the total is too low by 400,000 metric tons of rice.

These averages, however, give little indication of the wide seasonal variations in the crop output of the several countries. Such fluctuations sometimes range up to one-quarter of the average shown. Indian production, for example, has varied by as much as 20 percent. The methods of collecting these statistics are not standardized anywhere; therefore, the estimates must be taken as only rough approximations. It

is not clear to what extent deductions for seed have been made by the several countries.

PRESENT PRODUCTION AND FUTURE TRENDS

Japan

In Japan the rice area tended to increase steadily until 1932. In 1880, it was 2 million hectares and, in 1932, 3 million hectares. Since then, the area under upland rice has increased, taking up some marginal lands for rice production. The average production per hectare during the 1937-40 period was 2.94 metric tons of brown rice. This is a high yield, resulting from intensive manuring. At present, there is a dearth of manure and cattle, and the yields are likely to be less. A forecast of 1947 output of rice is not yet available, but the production in 1946, an exceedingly favorable year, amounted to 9.2 million metric tons of brown rice.

The possibilities of increasing the rice area in Japan are small. The preponderance of hilly and mountainous terrain sets a definite limit on the cultivated area. Because of this fact, only 16 percent of the total area of that country is cultivated at the present time. Persistent efforts have been made by the Japanese to increase the cultivated area during the past 20 years but without marked results. During the period 1918-39 the extent of land reclaimed averaged only 20,000 hectares, while the land lost to purposes other than agricultural exceeded that figure. Japanese yields are already high, but it will take some time for rehabilitation to be completed and the yields brought up to prewar levels. Neither in area nor in yield can marked increases be expected in Japan.

It has been estimated that the population of Japan in 1950 will be about 79 million, on the assumption of an increase of 1 million

persons a year, making a rise of 2.5 to 3 percent over the present population. It has also been estimated that the production of foodstuffs (excluding vegetables) suitable for rationing would be about 15.6 million metric tons. Of this amount about 12 million metric tons will be available for human consumption, taking into consideration certain industrial uses of food grains, waste in storage, and transportation losses. An additional production of 2 million metric tons of food and groundnuts per year may also be attained under favorable conditions. Rice is only one, although the most important, of the five major components of staple rations. Japan was never a net exporter of rice and, with the loss of Formosa and Korea, it will continue to be a deficit country. Its import needs of rice at the end of 5 years are likely to be approximately 2 million tons per year.

China, excluding Manchuria, produced an average of 50.6 million metric tons of paddy in the period 1931-37. This is equivalent to 37 million metric tons of milled rice. During and since the war, production has declined although rehabilitation has been undertaken and every effort has been made to increase rice production. If irrigation difficulties and the shortage of fertilizers continue and generally unfavorable conditions prevail, China's import requirements in 1947/48 will be about 3 million metric tons.

The production trend in future years, however, may be gauged from the data supplied by China in connection with the 1946/47 recommended allocations and also from the figure of 38 million metric tons given to the Study Group as the production prospect for 1950/51. China's production of rice in 1946/47 was approximately 36 million metric tons. Import requirements for 1950/51 may be about 1 million tons, provided that the fertilizer situation improves and the weather conditions are favorable.

Philippine Republic

It is difficult to give estimates of production in the Philippine Republic for the near future. Indigenous production for 1946/47 is estimated at slightly over 1 million metric tons. Import requirements in 1950/51 are now estimated at 0.6 million metric tons. It is expected, however, that by 1950/51 the Philippine Islands will be well on the way to self-sufficiency.

India

India's capacity for rice production varies widely, as the crop is dependent almost entirely on the monsoon. An adequate water supply for irrigation is guaranteed for only a fourth of the riceland of India. The remaining three-fourths has to depend on erratic rainfall, which can often delay planting and create drought conditions when the crop is growing and ripening. Production in 1946/47 was estimated at 28 million tons and the import requirements at 2.4 million tons. Total requirements for 1950/51, after taking into account the normal increase in population, are estimated at about 32.5 million tons. Since no substantial increase in production is expected during the next five years, import requirements are expected to be 3.5 million tons in 1950/51. Large deficits will thus continue.

Burma

The economy of Burma is almost exclusively dependent on the rice industry and trade. The rice area represents roughly two-thirds of the total cultivated area in the country. The cultivation of rice is widely spread but the density of rice area increases southward and is particularly concentrated in the delta of the Irrawaddy. There was a steady expansion of the area under rice up to 1930, the crop area increasing from 2.3 million hectares in 1890 to 4.2 million hectares in 1920 and to 5.0 million hectares in 1930. The great slump of 1930 caused a temporary setback, but recovery was complete by 1938/39 and the former steady increase seemed to be resumed so that in 1941/42 the crop area was 5.1 million hectares. During the latter part of the war the area under rice gradually declined, and in 1945/46 it totaled only 2.8 million hectares. The government is taking progressive measures to restore the lost area. As a result, the crop area increased in 1946/47 to 3.3 million hectares, and it would have been higher but for adverse weather in the dry zone of upper Burma resulting in a crop that was less than the preceding year due to slightly reduced acreage and low yields. It is hoped that under reasonable conditions 0.4 million additional hectares may come under cultivation in 1947/48 and perhaps another 0.4 million hectares in the following year, bringing the sown area in 1948/49 up to some 4.1 million hectares. Beyond this increase, progress is likely to be slow unless: (1) the cattle position is restored to its prewar state; (2) law and order are fully established in the

producing areas; and (3) prices remain at a sufficiently attractive level to make production worth while. The prewar level of 5.1 million hectares might perhaps be reached by 1951/52. Production of rice in Burma in the period 1935/36 to 1939/40 averaged 5.4 million tons, of which about 2.9 million tons were exported. Due to abnormal conditions created by the war, production in 1945/46 totaled only 2.0 million tons. The estimate for 1946/47 is 3.25 million tons, of which 865,000 tons have been earmarked for export. With the increase in crop area as mentioned above, it is hoped to recover the prewar position by 1951/52. However, taking into consideration the annual increase of 1 percent in population, the annual addition to the domestic demand for rice is estimated at 50,000 tons of paddy, which is equivalent to the produce of 32,000 hectares. It may therefore not be possible to reach the prewar export level of 3 million tons before 1952/53.

Korea

The normal rice area of Korea before the war was 1.6 million hectares and its average production 2.28 million tons. During the decade 1931-40 production increased largely in consequence of higher yields. The defeat of the Japanese resulted in a great deal of confusion in Korean agriculture because of the repatriation of Japanese agricultural administrators and technicians. The agricultural service has, however, been reorganized. In fact, for South Korea, the area planted to rice in 1946 exceeded the average for 1940-44 by 7 percent. The increase in area, however, was offset by a decrease of 18 percent in the total output, owing to the lack of fertilizers. In 1947 the production program was laid down with a view to reducing import needs to the minimum. The necessary conditions for its success are the availability of fertilizers, the continuation of irrigation and reclamation works, and the general improvement in agricultural practices. So far as the supply of fertilizers is concerned, there is a regular import program. Further, there are also a large number of projects on which improvement or construction work is scheduled to be completed in the near future. Of these, 25 major irrigation projects are already under construction involving 41,000 hectares of land. The major projects when completed are expected to increase rice production by 52,000 tons. The American administration has given rice production and over-all increases in agricultural output

priority as an economic objective in South Korea, and it has been estimated that in 1954 Korea will be in a position, after meeting the requirements of increased population, to export annually some 400,000 tons of rice.

Siam

The area of Siam under rice varied from 3.4 to 4.4 million hectares before the war. A special feature of Siam's rice economy has been the large variations in production and exports from year to year, caused mostly by monsoon conditions. Since the end of the war the government has launched short-term programs to promote rice production. It is expected that full agricultural rehabilitation will take about four years. Besides this, the Government of Siam has also long-term plans of development. First, certain irrigation projects are being developed by which the government hopes within seven years to bring 1.2 million hectares of additional land under irrigation and to increase production by 1.3 million tons. After the Chao Phya River barrage is completed, it is expected that over 39 percent of the total rice area will be irrigated, so that one of the uncertain factors of the prewar rice economy will have been eliminated to some extent as far as this percentage of riceland is concerned. Secondly, Siam hopes by means of irrigation, extension, and other measures to bring the total cultivation of rice area up to 4.9 million hectares which, after taking into account the increased domestic requirements arising from about a 3 percent annual increase in population, may yield an exportable surplus of approximately 1.6 million tons by 1954.

Indo-China

In Indo-China, the areas under rice are divided between Cambodia and Cochin China on the one hand, and Tonkin and Annam on the other. The latter two areas, which are over-populated, produce barely enough to meet their own requirements. Cambodia exported 50,000 to 200,000 tons of paddy in different years. Before the war, Cochin China was the most important rice-producing and rice-exporting area, exports amounting on the average to 1.5 million tons of paddy, white rice, parboiled rice, broken rice, and bran. The last year of normal production was 1940. Since then the population of Cochin China has increased an average of 100,000 per year which corresponds to an annual increase of consumption of 30,000

tons and this has resulted in a reduction of the surplus available for export. Moreover, the area under cultivation in Cochin China has decreased as a result of the Japanese occupation, shortage of labor, and reduction of animal power. This decrease in area is estimated at 30 percent and the restoration of the 2.4 million hectares to rice may take four or five years. In view of this situation, the Government of Indo-China has introduced a scheme for the increase of yield through intensive cultivation, important hydraulic works, greater use of fertilizers, and mechanization. The production in Indo-China, even under favorable political conditions, will not attain its 1940 level before seven years and even then the available surplus will be reduced by increased local consumption. The surplus available for export in 1954 has been estimated at 1.3 million tons.

Indonesia

The most important rice area in Indonesia is Java (including Madura), where about 45 percent of the total arable land is devoted to rice. Cultivation is very intensive and about 90 percent of the wet rice fields are irrigated. The harvested area of wet fields increased from 3.1 in 1930 to 3.7 million hectares in 1940. Production rose in the same period from 3.4 to 4.2 million tons of milled rice. These figures include the second crop of paddy, which is grown on approximately 10 percent of the area. The cultivation of upland paddy is of minor importance in Java, and the harvested area is steadily decreasing as many fields are gradually losing their fertility through erosion. Upland paddy was harvested from 436,000 hectares in 1930 and 365,000 hectares in 1940. Production decreased from 0.29 million tons to 0.25 million tons.

In other islands of Indonesia paddy is grown also in wet fields, but the cultivation of upland paddy is of much more importance here than in Java. Upland paddy is grown here mostly on fields not permanently in use. On these so-called "ladangs" only one or two rice crops are grown in 6 to 12 years. It is estimated that about 8 million hectares of land are in use for this non-permanent rice cultivation. The total production of milled rice (irrigated and upland) in the Outer Islands is estimated at 1.5 to 2 million tons.

During the Japanese occupation, rice production in Indonesia was considerably reduced, and after the war various causes contributed to keep production far below

the prewar level. Present production is estimated to be 30 percent below the 1940 level and it is expected to take at least five years before the prewar level can be attained. The possibilities of further extensions of the rice-growing area in Java are very limited, as reserve land of only 300,000 hectares is available and this land is generally of poor quality. In the other islands of the Archipelago there are better possibilities of extending the rice area both on irrigated and on upland fields. Prior to the war, plans had been drawn up to extend and improve the irrigation for thousands of hectares in those islands. The cultivation of paddy on upland fields can also be considerably extended and intensified in those islands.

Malaya

In the period 1931-41, rice cultivation in Malaya gradually expanded from 293,000 to 333,000 hectares, of which approximately 90 percent was wet rice cultivation. Crop yields varied considerably according to weather conditions but in general reflected the increases in area over the period, the output being 0.26 million tons of rice in 1931 and 0.33 million tons in 1941. The increases were due partly to the reduced profits from rubber making plantations available for riceland and also to the movement to render Malaya less dependent on outside sources for supply of this staple food. Malaya is a large importer of rice. In the prewar period, more than 60 percent of the consumption requirements of the country were met by imports, which in the period 1936-40 averaged 0.6 million tons annually. During the war years, when the country was under the occupation of the Japanese, production decreased considerably. The production in 1946/47 from 328,000 hectares amounted to only 0.25 million tons of rice, because much grain was lost in an exceptionally wet harvest.

Ceylon

In Ceylon, rice is cultivated mainly in the lowlands, but in the central parts some areas up to 5,000 feet above sea level are also cultivated. The greater part of the cultivable land is under plantation crops. Complete statistics on rice area and production are not available. It is estimated that in 1938/39 about 0.2 million tons of rice were produced from 320,000 hectares. The yields per acre are comparatively low, partly because of the extensive cultivation of early maturing varieties and partly because of the general practice of sowing

seeds broadcast. Manures are seldom applied to rice fields although green manuring is practiced in certain parts. In the prewar period, the local production formerly supplied only about one-third of the total quantity of rice consumed annually. The estimated production in 1946/47 is about 0.2 million tons of rice. Plans are under consideration to extend during the next decade the area under rice cultivation in districts where possibilities of irrigation exist.

LAND DEVELOPMENT AND RECLAMATION

The available information on cultivable waste land in the underdeveloped countries in Southeast Asia is neither complete nor very accurate. However, it can be stated definitely that in countries like India and China, with high pressure of population on limited areas, there are no large areas of really cultivable waste land that could be brought under cultivation by individual farmers in the near future. All the land, including in many cases marginal lands which it was within the means of the small subsistence farmer to cultivate, has been brought under cultivation. Any significant extension of crop area would require reclamation developments constructed at government expense.

In considering opportunities for new land development, the possibilities of reclamation through "river silting control" should not be overlooked. The developments in Burma illustrate what can be done. The rivers of Burma are continually increasing the amount of land available for rice cultivation by accretion. Reclamation of mangrove swamps in the maritime areas also provides a means of increase. Apart from these two types of land, there is little waste land suitable for rice cultivation in Lower Burma, and no spectacular increase in area is possible. There are considerable undeveloped areas suitable for rice cultivation in northern Burma and perhaps also in the Shan States, but these can be developed only by costly and highly organized schemes for clearing and drainage of lands, anti-malarial measures, and colonization, so that their development must be regarded as a long-term matter. The total area of cultivable waste land in Burma, excluding the hill areas, is recorded as some 7.7 million hectares but it is doubtful if 10 percent of this will ever be suitable for rice production.

While recommendations regarding new land developments must be applied to specific areas, the Study Group has agreed upon

a number of basic principles which it offers for the consideration of the governments of Asia.

- (1) The definition of cultivable waste lands as reported in official statistics needs to be expressed more precisely.
- (2) Detailed surveys of such land are needed in all countries of Asia. In carrying out such surveys it is desirable that at least one member of the survey party should be qualified to assess land-use capabilities. The services of a health expert and an anti-malarial expert are also clearly required.
- (3) In India specifically and in other countries generally, the control of diseases such as malaria is an essential beginning to the settlement of reclaimed lands. Equally important is the provision of an adequate supply of clean drinking water.
- (4) Special stress must be laid on the development of effective irrigation and drainage projects, both in the interests of malaria control and as a measure of elimination of excess of water.
- (5) Clearance of scrub jungle and of deep-rooted grasses which usually infest cultivable waste lands can best be undertaken through organized machine depots. These necessitate large fleets of tractors and suitable implements for land reclamation work, and provisions for their proper maintenance and operation. The cost of such reclamation work cannot be expected to be repaid by the new settlers except on a long-term extended payment basis. In any case, in the interests of increased production, the repayment of the capital expenditure required for the reclamation of such areas should not be a condition for the undertaking of such reclamation work.
- (6) Larger supplies of heavy machinery both for reclamation and drainage projects are urgently needed in Southeast Asia. The Study Group recommends that manufacturing countries be requested to give high priorities to production of such machinery, and that it be made available to those countries with the greatest need through an international organization dealing with rice.

It was not possible at this meeting to arrive at specific figures as to the extent of cultivable waste lands. As a result of discussion, however, it is estimated that approximately 2 million hectares could be made available for additional rice production if the suggestions stated above were

put into practice, assuming that the additional production facilities required are forthcoming.

DISTRIBUTION OF AREA BY COUNTRIES
Hectares

India	810,000
Japan	75,000
China	40,000
Philippine Republic	200,000
French Indo-China	500,000
Siam	410,000
TOTAL	2,035,000

LIKELY DEFICITS AND SURPLUSES IN THE
FUTURE

It will be clear from a perusal of the foregoing paragraphs that the problem of increased production divides itself into two parts: (1) rehabilitation of the war devastated countries, many of which are exporters of rice, with a view to bringing the production up to the prewar level; and (2) expansion of production by means of intensive and extensive cultivation in all rice-growing countries of Southeast Asia.

A great deal of uncertainty exists in regard to the pace of rehabilitation and the practical possibilities of intensification of cultivation. There are several big "ifs" in the programs—labor, money, and materials are in short supply, fertilizers are difficult to procure, and cattle are deficient in numbers. Moreover, several countries have not succeeded in collecting the essential economic data and several others do not possess the necessary facilities to do so at the present time. To attempt at this stage to give any definite figures of the probable production at the end of five or more years would hardly be realistic. Nevertheless the discussions at the meetings of the Study Group brought to light the extreme urgency for continued and concerted efforts toward increased production, in view of the grave shortage of rice which will continue for at least another five years.

It has been made abundantly clear by all members of the Study Group that every rice-growing region is making an all-out effort to produce as large a quantity as possible. But no country is in a position

to indicate specifically what it would be possible for it to achieve. In spite of these drawbacks we have made an effort to assess the supply prospects of rice in Southeast Asia. The following table gives a rough indication of the rice surpluses and deficits in 1950/1951.

TABLE 1—ESTIMATED RICE SURPLUSES AND DEFICITS ¹
IN 1950/51: MILLED RICE

Country	Surplus	Deficit
<i>Millions of metric tons</i>		
Burma	2.75	.....
French Indo-China	0.75	.....
Siam	1.00	.....
Japan .....	.....	2.00
India .....	.....	2.50
China .....	.....	1.00
Malaya .....	.....	1.00
Ceylon .....	.....	0.25
Indonesia .....	.....	0.80
Philippine Republic .....	.....	0.60
Korea	0.20	.....
TOTAL	4.70	8.15
		(deficit of 3.45)

¹The future supply situation has also been examined (See Chapter VIII, page 41) from the point of view of exportable supplies and import requirements. Appendix B (page 47) contains this information for 1952, where it is estimated that imports will be at least 3.5 million tons below requirements.

From the above figures it appears probable that the chronically deficit countries like India, China, Japan, Malaya, and Ceylon will continue to experience an acute shortage of rice for at least the next four years, in spite of the anticipated increase in production in the surplus areas. It is believed that the gap between the total rice requirement and the total production in 1950/51 will be at least 3.5 million tons, provided that the estimated production materializes and the present ration scale is maintained.

It appears that India, Japan, Korea, the Philippine Republic, and Malaya have a well-considered production program for the next 5 years. Other countries have still to formulate their plans in sufficient detail.

Fairly large finances will be required in stepping up production and if the deficit areas are to make any headway, the governments in these countries must give the highest financial priority to their production programs.

Chapter III

CONSERVATION OF AVAILABLE SUPPLIES

DURING the present period of serious world shortages of food, and especially of rice in Southeast Asia, conservation of available supplies is of paramount importance. Government estimates of import requirements for 1947 total 6.5 million metric tons, while supplies available for export for this year are less than 2.5 million tons. If, therefore, large sections of Asiatic populations are to be fed even on a minimum subsistence level, it is extremely important that every possible measure must be taken by member governments, now and for some years to come, to reduce waste and to make definite provisions for conserving the limited supplies of rice available.

Losses in the Field

While some scientific knowledge regarding prevention and control of pests and diseases is available, its large-scale application under field conditions has yet to be undertaken in most countries of Southeast Asia. Financial limitations of the small subsistence farmer have hampered the practical application of the available scientific knowledge. Governments of the countries concerned must therefore take the initiative in applying the results of research to the particular problems of pest and disease control in the field. In some of the underdeveloped countries it may be necessary to carry out such measures free of cost to the growers. The maintenance of a sufficiently large plant protection service to carry out effectively preventive and control measures in Southeast Asia is urgently needed and recommended.

The Rice Study Group has attempted to assess the annual losses resulting from pests and diseases affecting the rice crop. While no definite data are forthcoming, the consensus of opinion is that such losses may average from 5 to 10 percent in a normal year, but that under adverse condi-

tions the losses may amount to as high as 50 to 75 percent of the crop in particular areas. The extent of damage indicated above applies only to the standing crop in the field and does not include losses sustained in subsequent stages.

Losses in Storage

Although the available data are insufficient for estimating the total loss of rice in storage through infestation by rodents, insects, etc., it is admitted to be extremely large. In India, for example, it has been reported that losses of stored rice through infestation approximate one million tons a year. Large losses in storage are also reported from other rice-producing countries of Southeast Asia. The problem of rice storage therefore deserves the most careful attention and definite measures need to be taken by governments to combat these losses.

Modern warehouse construction for larger establishments is understood to be fairly satisfactory. Such warehouses are for the most part reported to be strong, ratproof, moistureproof, dustproof, and well-ventilated. The storage facilities on small farms in some areas are, however, unsatisfactory and inadequate.

There has been considerable research on the control of insect pests in storage. Although carbon bisulphide is widely used to control insect pests which attack rice, there is still some controversy as to the merits of this and other fumigants. The general impression is that the present methods of control of insect pests in storage are inadequate to prevent serious insect attack for any satisfactory length of time.

It has also been observed that even when the insect attack is controlled, the rice in storage deteriorates after a period. The grains suffer from discoloration, become soft and brittle, and produce a disagreeable odor and

taste. Rice stored for long periods in the form of paddy develops a poor milling quality, which reduces the percentage of recovery and increases the percentage of broken.

It is essential that rice intended for storage have a low moisture content. This should not exceed 10 to 12 percent in India. In the Philippine Islands, a maximum of 12 to 14 percent moisture content for paddy and 10 to 12 percent for milled rice is recommended. If the moisture content of stored rice exceeds these limits, the grains will be self-heated and spoiled. It has also been noted that rice keeps longer and insect infestations are better checked in clean storage buildings than in those containing old rice and debris. Storage buildings should also be properly ventilated and kept free from milling dust.

Parboiling and Milling

Parboiling of rice and elimination of over-milling are other methods of conserving rice supplies and the food value of rice. Rice at present reaches the consumer in the following forms:

- (a) raw, hand-pounded,
- (b) raw, lightly milled,
- (c) raw, polished,
- (d) brown rice,
- (e) parboiled, hand-pounded,
- (f) parboiled, milled.

Though the percentage yield (on the weight of paddy) of each of these forms depends to some extent on the variety of paddy and the degree of hand-pounding or milling, it may be said in general that the yield is highest for the brown hand-pounded or parboiled forms, a little less for undermilled, and much lower for highly milled rice. In fact, the outturn of parboiled or of hand-pounded rice is usually 6 to 10 percent more than that of ordinary milled rice.

Hand-pounded rice does not generally keep well for a long time since the bran layers of the rice are rich in vitamins and other nutrients which furnish an attractive food to weevils. Furthermore, the fat in the bran is likely to become rancid. The same conditions apply to brown and undermilled rice. In recent years, owing to the acute shortage of rice, hand-pounding and under-milling of rice have been advocated and in fact enforced by legislation in certain countries. Other countries however have found it impracticable to legislate in that field.

The Rice Study Group has discussed the possibilities of reaching an international agreement on the degree of milling but, as many mills are not properly equipped for light milling, it is considered that it is not feasible at present to undertake such action. However, this matter merits continuous attention.

Raw,¹ highly milled rice, though poorer in yield and nutritive value, has enjoyed greater consumer preference owing to its better appearance. Despite its superior nutritive value, parboiled rice has not as yet gained in popularity amongst all classes of consumers.

The process of parboiling consists of soaking paddy in water and then subjecting it to boiling or steaming for a short period. In this process the vitamins and other nutrients in the bran layer and germ of the grain are forced into and fixed in the endosperm. As a result parboiled rice is far less attractive to weevils than undermilled or hand-pounded rice. The partial gelatinization of the starch during parboiling also toughens the grains and reduces breakage during milling.

The process of parboiling has not been standardized. Rule-of-thumb methods are being used. With a view to securing increased weight, millers often do not dry parboiled rice to the required extent. Such rice does not keep well and develops an unpleasant flavor. Parboiled rice is thus of varying quality and there is a strong consumer prejudice against it in certain Asiatic countries. It is considered important that the parboiling process should be standardized to eliminate malpractices. There is also need for developing equipment and facilities suitable for small-scale parboiling operations.

It is interesting to note that attempts are being made in several countries to improve and standardize other processes whereby the keeping qualities of parboiled rice are increased. Among such methods is a modified parboiling process that employs a vacuum to remove air from the rice grains and uses high pressure to force hot water into the endosperm. The soaked rice is then steamed and partially dried in a rotary vacuum dryer. While this process gives a high yield of head rice of good quality, it can be successfully used only if processing is carried out on a large scale.

¹ Raw rice is rice which has not been treated prior to milling.

Another modified process recently developed in India consists of soaking rice in a hot dilute solution of calcium chloride. The product, which is called "calcured rice", has the appearance of raw, highly milled rice, while also possessing the desirable features of other parboiled rice. Calcured rice is claimed to be even less susceptible to insect attack than other parboiled rice; and it also supplies additional calcium, which is generally deficient in the diet of rice-eaters.

There is an urgent need for well-organized and international technical co-operation for securing improvement of the methods of parboiling rice. In certain countries, many people accustomed to raw rice have, during the present shortage of this cereal, changed over to parboiled rice without much difficulty, lending support to the view that well-directed efforts to expand the consumption of parboiled rice could succeed amongst all classes of consumers. The Study Group therefore *recommends*:

- (1) that with a view to effecting the maximum economy in storage and eliminating losses through depreciation and infestation, rice should be stored as far as practicable in the form of well-dried paddy;
- (2) that FAO should arrange to pool all information relating to research on rice storage and, if necessary, initiate further studies on the subject and advise member countries as to the practicability of eliminating storage losses;
- (3) that a large percentage of the rice supply should be parboiled since such rice keeps in good condition for longer periods;
- (4) that the consumption of parboiled rice or rice treated by similar methods and having higher nutritive value should be encouraged by governments, since such rice has distinct advantages over lightly milled or hand-pounded rice;
- (5) that an international body should extend research work on the methods of premilling rice treatment and should issue an authoritative report on the relative merits of various processes.

Losses in Transportation and Distribution

Many thousands of tons of rice are lost during movement and distribution through theft, careless handling, and poor packing. Several countries have claimed that shipping losses approximate 10 percent of their an-

nual import requirements. These losses have increased since the war on account of inadequate police protection of rice shipments, undue damage to containers, and careless handling. Shipments by boat are often handled so poorly as to reduce the quality sometimes to a point where the rice is unfit for human consumption.

It is *recommended* therefore that governments should take steps to see that these losses are minimized as quickly as possible. The furnishing of adequate police protection and trained handlers at loading and unloading centers would help reduce losses in transportation. It is also suggested that the authorities insist on disinfection and other effective measures for the maintenance of rice in good condition during transit.

Losses by Smuggling

It should be pointed out that in the present period of severe shortage, large quantities of rice are lost to the trade by smuggling operations carried on from surplus areas to nearby deficit areas. Reports of huge quantities being smuggled have recently been brought to the attention of government officials. Rice that otherwise would be available for ration supplies in various deficit areas is diverted to consumers on the basis of ability to pay and not of actual need. Efforts are being made by individual nations to prevent this form of loss and it is *recommended* that effective measures through international co-operation should be taken to prevent smuggling of rice. In some exporting countries, the movement of rice by sea from one district to another has been prohibited except under license. Compulsory registration of stocks and licensing of mills have been instituted and reports have been demanded on all movements of paddy and rice. These and other methods are suggested by the Study Group to the member governments to prevent the smuggling of rice.

It is generally agreed that the following measures will help ensure better availability of rice supplies during the shortage period:

- (1) prevention of waste in international movement through checks on theft, careless handling, or bad packing;
- (2) prevention and control of smuggling or other unauthorized movements of rice from country to country;
- (3) measures to provide rice growers with an adequate supply of other foodstuffs, textiles

and certain essential consumer goods, and the necessary materials and implements of cultivation;

- (4) disinfection and other measures for the maintenance of rice in good condition during transit;
- (5) stabilization of foreign exchange and the extension of international credits for agricultural reconstruction and development;

- (6) strict control over the utilization of rice for industrial purposes;

- (7) education of consumers to reduce losses in cooking and other wastage in the homes; and

- (8) reduction of the amount of rice fed to livestock in producing areas by provision of supplementary feed.

Chapter IV

CONSUMPTION AND NUTRITION

In several South and East Asiatic countries the shortage of rice for long periods during and since the war has revolutionized the diets of large numbers of people. Whereas in the prewar years daily per caput consumption of rice in many oriental countries averaged from 397 grams to 425 grams (14-15 oz.), an average of only 113 grams to 142 grams (4-5 oz.) per day per caput has been available in many districts during most of the postwar period. Measures have been taken by all countries to increase production and consumption of foods other than rice. Wheat, maize, casava, sweet potatoes, and other foods have been used in recent periods to fill out or supplement the consumers' ration. In the Philippines, for example, the government has entered into a "Grow More Beans" campaign to provide a supplement to the present rice ration and to decrease indirectly the per caput consumption of rice.

The recent experience of certain rice-consuming areas, where starvation became the only alternative to the consumption of wheat flour, contradicts the assumption that, when rice is unobtainable, the consumer who has been accustomed to rely upon rice for 80 to 90 percent of his calories will rather starve than eat any other cereal. In Malaya, for example, where before the war the per caput consumption of rice was higher than in any other territory in the world, the daily rice ration during the greater part of the second half of 1946 was only 65 grams (2.29 oz.) Even today it is only 130 grams (4.57 oz.). The total cereals ration varies from 150 grams to 194 grams (5.34-6.86 oz.). In Ceylon, where the prewar per caput consumption of rice exceeded 368 grams (13 oz.) daily, the rice ration for long periods during the war did not exceed 65 grams (2.29 oz.), and during the whole of 1946 it exceeded 130 grams (4.57 oz.) for a total period of only 56 days. The total cereals ration in Ceylon averaged only 211 grams (7.44 oz.) daily during 1946. In Mauritius

for a period of almost a year there was no rice at all.

The change from rice to other cereals and the drastic reduction in the total cereals consumption have not been brought about without some physical suffering and discontent. The full effects of the enforced change of diet and the enforced reduction in the consumption of cereals have yet to be seen and measured, but conditions of starvation have certainly not been widespread.

The Rice Study Group *recommends*:

- (1) that information be assembled by FAO regarding (a) the rations of rice, (b) the rations of other cereals and other foods, (c) the amounts actually consumed, (d) the per caput availability of all cereals, in all rice-deficit territories; and
- (2) that in rice-consuming territories where the rice ration has fallen to a very low level, the extent and effects of enforced changes in dietary habits be studied and reported to FAO for dissemination to member countries.

From the data submitted to the Rice Study Group by the major exporting and importing countries, it is clear that the rice consumers in the deficit areas cannot hope to return to their prewar dietary habits for many years to come. In 1952, the total rice requirements for the deficit areas, calculated at the rate of no more than 340 grams (12 oz.) per caput, (which is much less than before the war), is likely to be about 10.38 million tons, whereas the supply is unlikely to reach more than 6.8 million tons by 1954. If the population of the world increases at the present rate, 10 years or more are likely to elapse before the rice-eaters in the deficit areas will be able to consume as much rice per caput as they did before the war.¹

¹ These estimates assume no changes in consumer preferences. The implication of increasing demand for cereals other than rice are discussed later in this section of the report.

The objection, therefore, that it will be impossible to make them change their diet has to be reviewed in the light of the impossibility of obtaining rice. The change of diet brought about by the war has indeed come to stay, possibly for another 10 years or more.

The Rice Study Group agrees that the problems raised by the enforced changes in the dietary habits are economic and educational as well as agricultural and that, if the nutritional standard of the rice consumers in deficit areas is to be safeguarded and eventually improved, the solution of the problems does not lie in any one approach to them.

From the nutritional point of view, of course, the diversifying of the diet of those consumers who relied upon rice for 80 to 90 percent of their calories is a good thing, as recent experience has shown. In Japan, for example, rice was unavailable last August in some of the consuming centers; and it was later found that in those places where there had been no rice at all, the nutritional standard of the people had generally improved as a result of increased consumption of other foods.

In order that accurate and sufficient information be obtained, the Rice Study Group *recommends*:

- (1) that each member country be called upon to submit information regarding nutritional studies on rice to FAO and that the information be transmitted by FAO to other countries; and
- (2) that FAO call an emergency meeting of nutritional experts who have specialized in rice (a) to initiate studies to determine the comparative values of different types of rice produced in different parts of the world, and (b) to recommend the most suitable method of conserving and increasing the nutritional value of rice.

The prospect that the world shortage of rice will continue for many years gives

added point to the recommendation, made elsewhere in the Rice Study Group's Report, that measures be taken to prevent the high milling of rice to a degree dangerous to the health of the public; for high milling not only removes valuable nutrients from the cereal but also reduces the quantity of food available for human consumption. For the same reasons, the parboiling of rice, or its treatment by other methods productive of similar results, is much to be commended.

The estimate of the world's demand for rice in 1952, although based upon a per caput consumption of only 12 oz. daily by the habitual rice consumers, may prove to be an overestimate, for no allowance has been made for any increase in the demand for cereals other than rice. During the past few years, millions of rice consumers have been compelled to consume other cereals or starve. One result of this has been that large numbers of them, while no doubt still preferring rice, have developed a taste for other cereals; and it is by no means certain that the demand for rice will ever again reach the prewar per caput level. If it does not, then the world supply of rice may equal the demand sooner than now appears probable.

The shortage of rice, however, will certainly continue so long as other foods—other cereals (including millets), fish, eggs, meat, oils and fats, vegetables, and fruit—continue to remain in short supply. When other foods become available in larger quantities, it should be possible to determine what effect an increase in purchasing power will have upon the demand for rice.

Meanwhile the Rice Study Group *recommends*:

- (1) that the study of the effect of increasing purchasing power upon consumption trends be undertaken by member governments and reported to FAO for dissemination; and
- (2) that FAO and member governments study the effect upon future demand of the dietary changes brought about by the scarcity of rice.

Chapter V

IMPROVEMENTS AND EXPANSION OF PRODUCTION

THOSE familiar with the economy of South and East Asia have pointed out frequently that one of the most urgent problems confronting many countries is that of finding methods of increasing the level of agricultural production, especially of rice. This is necessary not only to meet the requirements of a rapidly growing population but as a prerequisite to any appreciable industrialization and other economic developments needed to improve living standards. In some sections of the region, notably those devastated by the war, the urgent problem is to restore rice area and yields that have fallen largely through depletion of stocks of working animals and equipment. Because of the numerous problems and obstacles involved, there is a tendency to assume that agricultural improvements must be made slowly over a long period of years. While this may be true generally, there is considerable evidence that, given proper stimulus, direction, encouragement, and assistance, the average peasant farmer of the Orient can, and will, make rapid progress in applying the knowledge of research to his farming operations and that, as a result, the output of rice in the areas now cultivated can be materially increased. In addition, there exist in several countries in the region significant areas that can be developed for rice culture if adequate irrigation, drainage, communication facilities, and measures for the protection of life, health, and property, are provided.

Irrigation and Drainage

The greatest single factor in the success or failure of a normal rice harvest is the availability of adequate and timely supplies of water either through rainfall or through controlled irrigation, or through a combination of both. The discussions of the Rice Study Group have revealed, however, that while an adequate volume of water of good quality is essential, this alone will not give

the desired yields unless its timely application is assured.

Drainage of both irrigated and rain-fed areas is almost as important as irrigation itself. The evidence presented to the Rice Study Group indicates that irrigation without adequate drainage has actually been harmful in practice in some countries. It has been made clear that, in the absence of adequate drainage facilities, there has been a progressive decrease in the yield from areas covered by some of the old irrigation systems and that, when suitable drainage projects have been constructed, the yield from the land has increased substantially.

The remunerative aspect of irrigation and drainage projects should not always be judged as the main criterion. The social benefits that accrue to the community or the country should also receive careful consideration.

Many smaller projects apparently would not require extensive reclamation structures. They could be developed as small community or co-operative enterprises with relatively low capital outlay per hectare. Many such small village irrigation and drainage systems are in existence.

The system of "river-training" for the purpose of developing lands through silting and for soil building on existing ricelands has been successful in several countries especially in the Pegu and Tharawaddy districts of Burma. The possibilities of further measures of this type should not be overlooked.

Experience in various irrigation practices in some countries supports the view that limited supplies of water may be utilized more efficiently and may result in a greater total production if the water is furnished on a volumetric basis rather than a crop-acreage basis, as is the custom in most parts of Asia. When water is supplied on

a crop acreage basis, growers in the less developed countries are encouraged to use an excessive amount. Far from benefiting the crops, such practices over a long period result in actual damage to the physical structure of the soil. Wasteful irrigation, which results from supplying water on a crop-acreage basis, has the further disadvantage that in areas having high temperature, low rainfall and high evaporation, and inadequate drainage, alkaline salts are accumulated in the soils, making them eventually unfit for cultivation. This is a serious danger which must be guarded against in the interests of conserving the land resources for the benefit of the ever-increasing population.

This subject requires further investigation, particularly to ascertain how widely it is possible to introduce the volumetric system and what effects overirrigation have on the chemical constituents and physical properties of particular soil types.

The Rice Study Group *recommends* that member governments take necessary steps to ensure:

- (1) that timely supplies of water are made available for the successful cultivation of the crop from existing irrigation sources;
- (2) that new irrigation projects planned for the development of ricelands make adequate provision for the availability of water at timely intervals to secure optimum production; and
- (3) that all new irrigation projects be so constructed as to provide adequate drainage simultaneously with the execution of the irrigation projects.

Manures and Chemical Fertilizers

Manures, including such organic materials as green manure, animal manure, compost, oil cakes, night soil, etc. have been utilized to some extent in most of the rice-producing countries of South and East Asia. Before the war, however, Japan, Korea, and Formosa were the only countries that used significant quantities of commercial fertilizers. While further extensive investigations are needed in many areas to determine the efficiency of adding plant food elements to ricelands, wartime experiences and the results of most fertilizer tests lead to the conclusion that both organic manures and chemical fertilizers must have an important place in any program for increasing rice production. In Java, for example, it has been found that in certain areas green

manure normally increases yields by 20 percent and also improves the protein content of rice. Likewise, in certain areas of Burma, Indo-China, and Java, the application of rock phosphate or superphosphate gives increases in yields ranging from 25 to 50 percent. India reports that green manure increases yields to almost the same extent as in Java, and, when phosphates are applied to green manure crops and the crops are turned under, there is an additional increase in the yields by as much as 10 percent.

Studies have revealed that under the high-humidity and high-rainfall conditions prevailing in South and East Asia, the most suitable form of readily available nitrogen is ammonium sulphate and in some instances cyanamide. In India, China, Japan, and Korea, where much of the riceland is deficient in nitrogen, the application of suitable quantities of ammonium sulphate increases yields by 15 to 35 percent.

From long continued experiments with ammonium sulphate on ricelands in Lower Burma, it appears that prolonged use of this fertilizer is deleterious to increased yield rather than beneficial. This suggests, however, that prolonged use of a single nutrient of this nature may have depleted available supplies of other essential elements to the extent that no crop-yield response is obtained. This result would be expected if ammonium sulphate were applied to acid soils or in excessive amounts. Further experiments may reveal that a balanced fertilizer or even a basic nitrogenous fertilizer is needed.

In Japan, where the three main commercial fertilizers as well as organic materials and ashes were extensively used in rice production, the estimated average application of nitrogen, phosphorus, and potash used in the prewar period (1931-40) was: nitrogen, 95 kilograms; phosphorus, 65 kilograms; and potash, 47 kilograms, per hectare. This gave an average yield of 3.8 metric tons of paddy per hectare, the highest in Asia.

Hence, it is concluded that in areas where increased production is of immediate importance and where manures are known to be beneficial, the use of manures ranks next to the provision of adequate water supply as a means of increasing the output of rice per hectare.

The Rice Study Group *recommends*:

- (1) that in India, China, Japan, and Korea where marked increase in production must

be attained, special attention be given to the expansion of fertilizer-producing capacity, and

- (2) that in view of the world shortage of nitrogenous fertilizers it be brought to the attention of the IEFC that further allocations of nitrogenous fertilizer intended for rice production in South and East Asia should consist of sulphate of ammonia in preference to other forms of chemical nitrogen.

Plant Breeding

The breeding of rice probably began in centuries past when alert farmers collected and increased seed of off-type plants which appealed to them—hence the numerous varieties in Asia. Breeding methods based on knowledge of plant genetics developed in the early twentieth century are used in most rice-producing countries of South and East Asia. These methods are: (1) the collection of local varieties and the introduction of foreign ones for testing under varied conditions; (2) pure-line selection and testing for yield of local and introduced varieties; and (3) hybridization or crossing of varieties and the isolation of selections which possess the desirable qualities of both parents. Each method has been used to marked advantage.

The varieties developed by pure-line selection from native varieties have, when grown under suitable cultural practices, increased yields from 10 to 20 percent. In Japan, early maturing selections from native varieties and from hybrids have made it possible to grow rice in the spring wheat areas as far north as northern Hokkaido. Furthermore, in Japan and Java, varieties developed by hybridization when grown by good cultural, irrigation, and fertilizer practices yield from 10 to 15 percent more than that of pure-line selections. Exporting countries have also improved by selection and breeding both rice quality and yield; for instance, in Burma, yields have been increased by 10 to 15 percent. In rice deficit countries the main emphasis is on breeding for higher yields rather than for quality. In all countries breeding for disease resistant types needs to be emphasized.

Success in the distribution of improved seeds to growers varies markedly in the several countries. In some countries where a considerable degree of success has been achieved subsidization in some form or other has been used. This suggests that subsidization might be a means of achieving

wider distribution in countries where little success has yet been obtained.

After considering the results of breeding data furnished by the countries represented, the Rice Study Group came to the conclusion (1) that little co-ordination of experiments between countries exists; and (2) that valuable work has already been accomplished, as a result of which the yields in some countries have been increased by 10 to 30 percent.

The Rice Study Group *recommends*:

that an FAO catalogue should be prepared showing the breeding stocks available in the various countries and briefly describing their agronomic characteristics, their disease-resistance quality, and other desirable features for the use of rice-breeders throughout the world.

Manpower

The labor supply on rice farms in major rice-producing countries may be divided into two main groups, the regular farm workers and the occasional workers. Regular farm workers include the farmer or tenant, his family members and laborers hired for the whole crop season. During the transplanting and the harvest-threshing seasons, the labor requirements cannot normally be met by the regular farm workers. Hence, casual or occasional workers are necessary to supplement the regular labor in most countries. In Japan, Korea, and Indonesia, however, casual labor supplies are not a problem.

Critical labor shortages are not entirely a wartime or postwar phenomenon. Difficulty was experienced prior to World War II in securing sufficient occasional labor in several countries, particularly in India. During and since the war, the great increase in employment opportunities at high wages, coupled with certain basic social changes, have added to the difficulties in occasional labor problems.

Population shifted in large numbers from the villages to the cities, attracted by higher wages and employment in the factories, workshops, and large military projects. Such labor as migrated to the cities has apparently come to stay; if so, this will mean a permanent loss of manpower to the farms. Unsettled conditions in backward areas and the dangers to life and property in unprotected villages, particularly in parts of Siam, Burma, and Indo-China, have added to the unattractiveness of country life.

In places ravaged by war, agricultural labor has become scarce and in the parts

of Asia which came under the enemy occupation, many rice fields are reported to be completely idle still for want of farm hands.

All rice countries have commenced or are contemplating programs for development of machinery for rice production in order to offset the labor shortage and to increase the efficiency of production. This, however, is a relatively costly undertaking. The number of suitably trained men is inadequate, as are also the facilities in Asia for developing and producing farm machines.

Members of the Study Group are in agreement that:

- (1) in countries where critical labor shortages exist, the problem may be solved by partial or complete mechanization of cultural and harvest-threshing operations wherever practicable in relation to farm economics; and
- (2) in order to avoid costly failures, continuous consultation and exchange of information on the development of farm tools and machines is urgently needed.

Remarkable success in mechanization of agriculture has been achieved by such countries as Australia and the United States, where rice farming is 100 percent mechanized. Plowing, bunding, sowing, drilling, harvesting, winnowing, and threshing are all done by machines, and the rice yields per acre are among the highest of the producing areas.

There is complete lack of information in Asiatic countries on the practical and economic aspects of mechanized rice production. The majority of holdings are small and lands are low-lying and heavy. The available types of tractors may be too heavy, and special light tractors and implements may have to be designed. The effect on mixed farming of mechanization of cultural-harvest operation and the consequences of displacement of manual labor have to be investigated. It is, therefore, most desirable that data and factual information bearing on the scope for and limitations of mechanization of rice production in South and East Asia should be obtained as quickly as possible.

Animal Power

As a result of the war, there is a shortage of animal power in all the rice-producing countries of Asia. In some countries this shortage is aggravated by the lack of adequate feedstuffs, which has lowered the efficiency of the working animals. This is definitely a limiting factor in rice production

in Siam, Burma, Indo-China, the Philippines, and parts of China.

Since the shortage of draft animals is common throughout the entire region, no relief is possible through importation. Natural regeneration is the only source of replacement. All countries have active programs of disease control to reduce the hazard of loss to the existing stock. It will be a number of years, however, before the animal numbers can be restored to the prewar level.

Land Tenure

Conditions of land tenure throughout the Far East have for many years been a serious obstacle to the economic well-being of the cultivator. The average holding in most of the countries is only about one hectare, although in Burma, Siam, and Indo-China it is substantially higher. Most farms are operated by tenants and extremely high rental rates are common. In some countries rents are as much as 75 percent of the annual crop produced.

After sharing his meager income with his many creditors, the tenant is usually left with insufficient funds to finance his production requirements, such as fertilizers, implements, and seeds, etc. and to buy food, clothing, and fuel for his family.

The result of the present tenancy system in Asia is that most farm people live on a subsistence level, with little hope of bettering their position. Some far-reaching changes in the tenancy system are called for in most countries. All countries represented at the Rice Study Group are agreed:

- (1) that the cultivator of the land must receive his rightful share of the benefits from the land;
- (2) that countries should work toward a situation whereby holdings would be of an economic size for each cultivator and his family, and could not be fragmented; and
- (3) that alternative occupational opportunities must be provided to absorb surplus agricultural workers.

Agricultural Credit

Because of the peculiarities of agricultural production and distribution, provision of agricultural finance and its effective canalization has always been a difficult problem. This is especially true in most of the Asiatic countries, where subsistence farming by a large class of small peasant holders following traditional practices of cultivation is

still the predominant feature. Unless there is organized production and orderly marketing, commercial banks hesitate to extend funds, and the peasantry are forced to depend on loans from money-lenders, advances from landlords, and other local and non-institutional sources of credit. Under such conditions agricultural credit has naturally become costly and burdensome. High rates of interest, ranging from 18 to 36 percent on secured loans and from 50 to 250 percent on unsecured loans, have become a prevalent feature of the agricultural economy in these countries.

The alternative sources of credit are the government and co-operative institutions. Owing to the urgency of increasing rice output, the substantial funds needed particularly for large developmental projects, and the attendant risks involved, governments in several countries have increasingly had to undertake the provision of direct financial aid to the farmer. The Government of Burma in 1946/47 issued loans amounting to 2.25 million pounds sterling under the Agricultural Loans Act, and provision for a similar amount has been made for the year 1947/48. An estimate presented by the Indian members indicates that, to reach the production goal of an additional 2.5 million metric tons of rice annually in the short time programmed, India's over-all gross expenditure in lieu of adequate credit would be of the order of 190 million pounds sterling. Half of this expenditure represents inducement payments to the grower himself and his laborers, and the other half would be required as a cash investment for works and for purchase of articles essential to production. India hopes to meet at least one half of the necessary expenditure from the development grants of the Central and Provincial Governments.

The provision of normal long-term finance needed for permanent improvements on land should, however, be the function of organized credit institutions, such as land mortgage banks or agricultural credit corpora-

tions operating on long-term funds raised by the issue of bonds secured against the lands mortgaged. Such institutions, supported either by government guarantee or by direct subscription from the government, are operating with considerable success in parts of India.

The provision of short- and medium-term funds needed for cultivation and marketing and for the purchase of some of the more costly agricultural requisites has to be placed on a more assured and less costly basis than at present. The possibilities of co-operative organization in this direction have to be more fully explored. It has been the experience of countries like India, Burma, and the Philippine Republic that credit without proper control of its use may prove definitely injurious to an untrained peasantry. A system of controlled credit has, therefore, been instituted in places, such as the province of Madras in India, where co-operative activity has made considerable progress.

In spite of all the assistance and encouragement given by governments, the progress made by the co-operative movement has been dishearteningly slow. This has given encouragement to the establishment of special credit institutions run by the State or by State-sponsored public corporations. Side by side with these institutions, there is need for regularizing indigenous channels of credit and for mobilizing them more fully on better banking principles. It is *recommended* by the Rice Study Group:

- (1) that credit at low interest rates, both short- and long-term, should be provided, preferably through co-operatives or agricultural banks, in all the rice-producing countries in Asia, to meet the bona fide needs of the cultivators; and
- (2) that any credit programs developed under government sponsorship should enable the farmer to satisfy all his bona fide financial needs from a single source.

Chapter VI

IMPROVEMENTS IN DOMESTIC MARKETING AND DISTRIBUTION

BECAUSE most of the world's rice is grown on small subsistence farms, the development of advanced marketing methods has been retarded. The small production per farm makes it almost impossible to secure the advantages of large-scale marketing. Only a small proportion of the world production enters the commercial market. Competitive enterprises to establish advanced marketing methods are not, therefore, as strong for rice as for other cereals.

It is believed that improved marketing methods in Asia would increase the availability of rice for deficit areas because producers would be willing to grow more rice if they could be reasonably certain of greater returns from marketing their rice by new and improved methods.

The Rice Study Group, within the time available, has been able to review a few of the problems and has put forward certain specific suggestions for the improvement of domestic marketing in South and East Asia.

STANDARDIZATION OF TERMS

The Study Group has been impressed by the confusion that exists concerning the terminology applied to various kinds of rice and has come to the conclusion that one of the basic steps towards improved marketing and distribution of rice, including market intelligence and statistical services, must be the development of a set of terms that are clearly defined and well-understood by producers, distributors, and consumers alike. The Rice Study Group recommends:

- (1) that the following definitions be tentatively adopted by member countries; and
- (2) that FAO submit these definitions to a committee of millers and traders for examination with a view to promoting their general adoption in international marketing and statistical reporting.

Paddy or rough rice: Rice with husks on and without any portion of the stalk, as it comes from the farm. The term *paddy* is used in Burma, India, Ceylon, Siam, and Indo-China; *padi* in Malaya; *palay* in the Philippines; *rough rice* in Japan, Korea, and the Western Hemisphere; *gabah* in Indonesia; and *kwo* in China.

In the case of Indonesia, where paddy is harvested and marketed with part of the stalk, the term *stalk paddy* is suggested.

Husked rice or brown rice: Rice from which the husk only has been removed; it still retains all bran layers and most of the germs. (Approximately 25 percent loss in weight in conversion from paddy.) Equivalent terms are *cargo rice* in Siam and French Indo-China; *loozeein* in Burma; *pet-jahkoelit* in Indonesia; and *pinawa* in the Philippines.

Milled rice: Rice which has had the husks, germs, and bran layers partially or wholly removed. It includes broken.

Hand-pounded rice: Rice from which the husk, germs, and bran layers have been partially removed without use of power machinery. It includes broken.

Raw rice: Rice which is milled or hand-pounded from paddy, which has not been given any heating treatment.

Parboiled rice: Rice milled or hand-pounded from paddy, which has been soaked in water and heated by steam or some other means.

Polished rice: Milled rice from which the husks, germs, and all bran layers have been wholly removed and which has been polished. This is equivalent to *white rice* in Siam, Burma, and the Western Hemisphere.

Coated rice: Rice which has been coated with glucose or talc or any other foreign substance.

Whole rice: milled or hand-pounded rice consisting entirely of whole grains and

grains not smaller than three-fourths broken.

Broken: broken rice kernels with sizes bigger than one-fourth and smaller than three-fourths of whole grains.

Brewers rice or fragments: pieces of broken kernels of milled rice smaller than one-fourth of whole grains.

Rice husks: the outer covering of the rice kernels. Husks are equivalent to "hulls" or "chaff".

Rice bran: the outer bran layers and germs. It is equivalent to *cargo bran* used in general trade in Siam and *cow bran* in Burma. The bran obtained from milling parboiled rice in Burma is known as *brown bran*.

Rice polishings: the inner bran layers, with small percentage of the starchy interior of the grain. It is equivalent to *white meal* in Siam and Burma.

STANDARD WEIGHTS AND MEASURES

A second method of improving rice marketing is by standardizing the various systems of weights and measures used in different countries. The weights and measures used in most of the rice-producing and rice-consuming countries of the world vary greatly, not only from one country to another but also in the same town or city. Such multiplicity of weights and measures gives to the intermediaries responsible for assembly and distribution of rice an easy means of manipulating prices in their own favor. In most of the countries of South and East Asia, where rice is as a rule grown on small farms, a very large part of the crop is moved to local assembly centers by middlemen, and the prices they pay to producers are not always fair.

Since prices are not quoted on the basis of any uniform weights or measures, they are not easily comparable, and the producers and consumers in different areas do not generally have an exact idea of the prices prevailing in the assembling and distributing wholesale markets. A great deal of difficulty is also experienced at present in comparing international statistics, particularly regarding prices. It is suggested that the adoption of standard weights and measures for both national and international use will go a long way toward improving the situation in this respect.

Some governments have passed legislative measures for the establishment of standard

weights and measures. For example, in India, the Central Government passed an act in 1939 prescribing the units of standard weights for adoption throughout the country. Two systems of weights are used, one based on the local weights in seer and maund and the other on avoirdupois weights, i. e., pounds, hundredweight, and tons. The former set of weights are generally used in domestic trade, etc., and the latter for purposes of international statistics and trade. Some of the provincial governments in India have also passed local legislation prescribing standard measures for adoption in their territories. The use of measures is, however, being discouraged in India as far as possible.

In Burma, a basket with a cubic capacity of nine imperial gallons has long been the standard measure for all governmental purposes. An imperial basket of milled rice is usually considered to be 75 pounds (34 kg.) in weight. Rice is also sold in bags of 225 pounds (102 kg.). The Burma Paddy Measuring Act prescribes the use of this standard basket which is known as the "Tin-Han" for all transactions in paddy.

Actual transactions at mills are normally carried out by weighing samples and adjusting the quoted price to the weight by a percentage allowance. Prior to the war, rice transactions in a number of cases were made solely with reference to weight. This practice was spreading in Burma before the war.

The Rice Study Group, after taking into consideration the conditions in the various countries, *recommends:*

- (1) that, as a first step towards securing a fair price for the producer and facilitating trade, each country that has not already done so should take necessary action to introduce and establish standard weights and measures for rice; and
- (2) that, for purposes of international statistics, each country should report its statistics of production and international trade in metric tons and those for area in hectares.

Appendix C, page 48, shows the complex systems of weights and measures commonly used in various countries of South and East Asia for recording official statistics.

CLASSIFICATION OF RICE VARIETIES

Considerable confusion is also occasioned in the rice markets of South and East Asia by the multiplicity of grades and varieties.

The Study Group has recognized this problem and has recommended standard grades to be adopted where this has not yet been done. Further study in the matter is also recommended.

In most of the producing countries the number of rice varieties under cultivation is very large indeed. For example, in India alone, about 5,000 botanical varieties are reported to be grown. A great many of these varieties are, however, used only for local consumption. Further, the quality differences of certain varieties are so negligible that for commercial purposes they are classified under the same name. Over 80 varieties of rice are commonly used in rice trading in India.

In Burma, the different varieties of paddy are classified for milling purposes mainly under five heads. (1) *mgasein*, (2) *meedoung* or *medon*, (3) *sugandhi* or *emata*, (4) *letywezin*, and (5) *byat*. The designation is not merely a milling term. It is a classification depending primarily on the boldness or slenderness of the grain (i. e., the ratio of length to breadth), *emata* being the slenderest grain, and *byat* the boldest. Each one of these classes includes a large number of botanical varieties, most of which are milled in both raw and parboiled forms. There are however, certain others—for example, *ekarwin* belonging to the *emata* group and *kaulgyi* of the *byat* group—which are milled only in raw form. From each of the varieties of paddy, several grades of milled rice are prepared.

Because of the variations in soil and climatic conditions and in water facilities available, the number of varieties suitable for cultivation in different areas has to be fairly large. There are hardly any varieties which would thrive under all conditions. The existence of an unnecessarily large number of varieties is undesirable, however, as it leads to a great deal of confusion in trading. It would appear necessary for the number of varieties to be reduced to a minimum without, of course, affecting in any way the yields and the market value of the crops. The work done on this subject by the Agricultural Department in Madras has shown that the number of varieties under cultivation could be substantially reduced. For example, in the Krishna-Godavari deltas of Madras, which cover a rice area of more than 3.5 million acres (1.4 million hectares) and about one-fourth of which is under double cropping, 14 improved types only are considered sufficient for the

whole area, as against several hundreds actually cultivated.

GRADING

In most of the countries in South and East Asia no standard grades for rice are in existence. The great bulk of the internal trade is conducted on the basis of samples, and the quality is determined generally by visual examination before a price is quoted; there are no fixed scales of allowances for impurities and other defects. As a result, prices are quite often settled only after considerable bargaining.

In export trade, business is conducted on the basis of certain commonly recognized grades, but in most cases the quality indicated by each grade is not clearly specified. For example, in Burma a considerable amount of business is done in "Small Mills Specials" which is supposed to contain 38 to 42 percent of broken.

Prior to the war, only a small proportion of the rice crop of Indo-China was sold direct to the importing countries, the greater part being shipped through Hongkong, where in the absence of standard grades it was quite often mixed with inferior qualities. The reputation of Indo-China rice suffered greatly in the world markets by these practices. As no standard grades existed, buyers were hesitant to trade directly as they could not be sure of the quality they could expect to receive against their orders.

In Siam there are generally recognized commercial grades of paddy and milled rice. Paddy is divided into three kinds: garden paddy, field paddy, and glutinous paddy. Siam polished rice is also traded on the basis of standard grades.

The bulk of the rice exported from Siam is consigned to Hongkong and Singapore, whence some of it is re-exported to various countries. In 1938 about 30 percent of the total export was shipped direct from Bangkok. It is generally believed in Indo-China and Siam that the reputation of their rice has suffered greatly from adulteration with inferior rices by Hongkong and Singapore dealers. Further, the transshipment of rice at Hongkong and Singapore increases the cost of Siamese rice to consumers and reduces proportionately the prices paid to Siamese growers.

The numerous advantages of having well-defined grades need no emphasis. In the absence of standard grades, as already stated, business has to be conducted on the

basis of samples which require personal inspection before the transaction is made. While this may not be found very inconvenient in local sales, it involves a good deal of trouble and expenditure in trade between distant markets and different countries. It discourages direct trading and leads to disputes over quality between buyers and sellers. Further, the prices which are quoted for different markets on the basis of local grades are not quite comparable since the Grade I of one market is quite often inferior to even Grade II of another.

In certain countries, for example the United States and Italy, legislative measures have been taken to prescribe well-defined standard grades. In India, also, the standard grades have been prescribed for a few well-known varieties under the Agricultural Produce (Grading and Marking) Act of 1937. The quality factors of such grades have been very clearly defined.

The factors generally taken into consideration in adjudging the quality of rice are: (1) shape; (2) slenderness (i. e., ratio of length to breadth); (3) color, degree of milling, polishing, and coating, if any; (4) ratio of broken; (5) damaged grains; (6) weeviled grains; (7) presence of grains of other rice varieties; (8) foreign matter; (9) weight; and (10) in the fine varieties, age and aroma. In grading particular varieties, it is desirable, of course, that all of these quality factors should be taken into consideration as far as necessary and feasible.

Besides introducing and popularizing standard grades for rice within countries, it is also necessary that the standard grades for rice entering international trade recognized both by the exporting and the importing countries. This would save much of the trouble experienced at present when buyers refuse to accept the rice tendered as not being of the desired quality.

The Rice Study Group *recommends*:

- (1) that each country take the necessary measures to establish standard grades for different qualities of rice if these have not already been established; and
- (2) that FAO through its member countries arrange for wide acceptance of the standard grades for rice entering international trade.

CROP FORECASTING AND ESTIMATING

The Rice Study Group considers accurate crop forecasting and estimating to be

a primary prerequisite to sound planning, especially as a basis for determining national food requirements and equitable ration levels. Only by developing efficient crop estimating and reporting systems will the rice-producing and rice-consuming countries of Asia be able to determine accurately their available production and, in turn, their import requirements. The welfare of these nations in future years may be greatly advanced by the extent to which an adequate and accurate record of past production and an early forecast of future production are available. The lack of such information regarding the location, intensity, and extent of food shortages in various countries has, in the past, prevented the initiation of relief measures until privation and starvation had reached critical proportions. Any history of famine in the world will testify strongly to this fact. In times of crop shortages an accurate and early appraisal of their extent in any country might save much valuable time in securing food from surplus areas.

The wide differences that exist in the crop reporting and forecasting methods employed are illustrated by the following summaries of procedures in various countries.

Japan

Prior to 1943, the final rice crop returns based on actual harvest were made under the jurisdiction of the Statistics Section, General Affairs Bureau, of the Ministry of Agriculture and Forestry. Since then the Examination Section of the Bureau of Staple Food Administration of the Ministry has taken over the responsibilities of reporting the rice crop. Each prefecture has a number of branch offices under the prefectural office, usually one in each *gun*.¹ Cities and towns have sub-branch offices for food inspections. These sub-branch offices are headed by food inspectors, who are in charge of staple food inspection as well as final crop reporting.

During the harvesting period, the food inspector, accompanied by a few assistants, visits each *buraku* of the *shi*, *machi*, or *mura*² and makes surveys to select representative plots for taking sample harvests.

¹ *Gun* is a subdivision of a prefecture corresponding roughly to a county in the United States.

² A *shi* is a city with a population usually in excess of 30,000; a *machi* is a town with a population usually in excess of 4,000; a *mura* is a village or township; a *buraku* is a social economic unit, consisting of approximately 20 households, and is a subdivision within a *shi*, *machi*, or *mura*.

Paddy and upland areas, and glutinous and nonglutinous rice areas are considered separately. In each *buraku* the different kinds of rice and rice fields are classified into three categories, i. e., good, medium, and low, according to the growing condition of the respective crop. Sample harvests are made usually from an area of one *tsubo*,³ but sometimes a larger area is included as one sample. At least five of the *tsubo* samples are taken from each *buraku* and more than 50 *tsubo* samples are required for each *shi* or *mura*.

After the crop is harvested from each sample *tsubo*, it is threshed and weighed. From the weight of rough rice, the brown rice is calculated and converted into volume measures in order to derive the rice yield in *koku* per *tan*.⁴

During 1946 the 46 prefectures of Japan had a total of 10,467 *shi* and *mura*. With 50 or more samples per *shi* or *mura*, over 500,000 *tsubo* sample-harvest records are available for the calculation of the final rice crop returns.

The dates set for the final rice crop returns in Japan are based upon the actual harvesting period in various areas. The nation is divided into three areas for this purpose. The prefectures in the Hokuriku District are included in the first area. Here all the investigations are completed from 1 October to 1 December and reports submitted to the Ministry of Agriculture and Forestry before 20 December. The second area includes the Hokkaido, Tohoku, and Kwanto Districts (including Yamanashi and Nagano Prefectures). In this area, investigations are completed from 1 November to 1 January and reports submitted to the Ministry before 20 January. The third district includes the Tokai (including Gifu Prefecture), Kinki, Chugoku, Shikoku, and Kyushu Districts. Investigations are completed in this area from 1 December to 1 February and reports submitted on 20 February to the Ministry.

Two official rice production estimates are made before harvest time each year. The first is made on 20 September by each prefecture and is submitted to the Ministry each year on 30 September. The second is made on 31 October in each prefecture and is submitted to the Ministry

on 10 November of each year. The national official estimates are compiled from reports submitted by the heads of *shi*, *machi*, and *mura*, through the *gun* to the prefecture and then to the Ministry.

With the promulgation of Imperial Ordinance Number 103, dated 31 March 1947, a new crop-reporting service was established in Japan. The new system elevates the former Statistics Section of the General Affairs Bureau of the Ministry of Agriculture and Forestry to the status of a Bureau, known as the Bureau of Statistics and Survey and reporting directly to the Ministry of Agriculture and Forestry. The Crop-Reporting Section is one of three independent sections within the new bureau, and will be the agency solely responsible for data on planted areas, crop conditions, damage estimates, and production forecasts and estimates.

Independent crop-reporting field offices will be established at each prefectural headquarters and for each five villages. It is expected that selection of field personnel will be completed by 1 August 1947. Pending completion of personnel assignments and the creation of adequate operational procedures, the crop-reporting function will continue to center as at present in the Inspection Section of the Central Government's Food Management Bureau and the Inspection Section of the Economic Department of the Prefectural Governments. However, since personnel of the latter units are to be federalized and absorbed by the Central Government's Food Offices at each prefecture, some immediate improvement in agricultural data may be anticipated.

South Korea

During the Japanese annexation from 1910-1945, there existed in Korea a system of crop reporting at the provincial level. Each provincial governor was responsible for obtaining the agricultural statistics as required by the National Government, and funds were provided in the provincial budgets for this purpose.

A great laxity existed in this procedure as evidenced by the many overdue reports, the failure of employees in every level of the government to realize the importance of accurate and timely reporting, the use of statistical employees on other jobs with a resulting sacrifice to their primary duties, and numerous other reasons. There must be one centrally controlled and unbiased organization vested with the sole respon-

³ A *tsubo* equals 0.083 acre (0.0134 hectare).

⁴ One *koku* equals 150 kg. or 5.119 bushels; one *tan* equals 9.917 ares or 0.245 acre.

sibility of compiling, analyzing, and publishing timely agricultural data which could be considered accurate and authoritative.

Considerable study was given to this problem throughout the year 1946 by experienced statisticians in the government service with a view to proposing an effective system of crop reporting for South Korea. Transportation and communication difficulties, lack of qualified personnel, and other problems were considered in arriving at the proposed plan of gathering, analyzing, and publishing agricultural data.

About 1 March 1946, an ordinance which established a new system of crop reporting in South Korea was approved by the U. S. Military Governor. Its purpose was to set up one source of authoritative estimates of the production and consumption of food, fibers, and forest products for the general information of public officials and citizens.

Under the new organization the Crop Reporting Board is established in the Department of Agriculture and consists of nine members. The chief of the Bureau of Agricultural Economics serves as its chairman, and the chief of the Agricultural Statistics Section as its executive secretary. The seven remaining members of the Board are designated by the Director of the Department of Agriculture as follows: one statistician from the Bureau of Fisheries, one statistician from the Bureau of Forestry, and five statisticians from the Agricultural Statistics Section. They are given responsibility separately for estimates for the following categories of crops: (1) rice, (2) other cereal grains, (3) leguminous crops, (4) fruits and vegetables, and (5) industrial crops, hay pasture, and livestock.

The position of Provincial Agricultural Statistician was established in each province. The incumbents of this position assist the Board in carrying out its duties and functions, and are administratively responsible directly to the Chairman of the Board. The Provincial Agricultural Statistics Subsection is responsible to the Provincial Agricultural Statistician. Similarly for the *gun* (county) and *myun* (village), the position of agricultural statistician was established, with the *myun* responsible to the *gun* and the *gun* to the province.

In addition, a small number of production technicians are to be employed at the national headquarters, in order to investigate the growing condition, and estimate the yield of rice and other major crops. The Tsubogari and Zungari methods of estimat-

ing rice yield, which are similar to those described in the system of estimating in Japan, are employed in South Korea.

Because of the present difficulties of transportation and communication and the necessity for training personnel, it will be some time before this organization will be functioning effectively. It does appear, however, to be a future solution to crop-reporting problems in South Korea.

India

In India, there is a long-standing practice by which the acreage and yields are reported year after year. This work is done by an agency of graded officers, beginning at the village level, which deals with the collection of land revenue and also attends to the collection of statistics on areas and yields of crops. The area planted is ascertained by plot-to-plot enumeration by the village officers, who inspect all fields in the jurisdiction twice a year and note kinds and acreages of the crop. The crop area is, therefore, known with a high degree of accuracy in the settled parts which possess the elaborate revenue agency of village officials, but the report on crop area is unsatisfactory in the unsettled regions which neither require nor possess any elaborate revenue agency. The yield per acre is obtained as a product of the normal yield and the "condition factor." The estimate of the crop, which is basically an eye estimate, is usually expressed in terms of *annas* with a fixed number of *annas* representing the normal. This basic information from the village passes through the graded set of officers leading up to the Director of Land Records on Agriculture, where the *anna* values are ultimately converted into yield in pounds.

The method is open to criticism on the ground that it is liable to underestimates or overestimates. This method alone does not provide a basis for judging the direction or the magnitude of variation.

Very recently the collection of yield statistics has been put on a scientific basis by application of the modern statistical principle of random sampling, and production surveys have been carried out in many provinces by crop-cutting experiments. A comparative study of the data obtained by the older method eye estimates and by the modern crop-cutting method has revealed that the yield estimates obtained by the two do not vary so much as to rule out the validity of the early data and has also given an indication of the extent of overestimate

or underestimate in the traditional method of ascertaining yields. These variations, surprisingly enough, are generally small. Yield estimates, however, are being made more and more accurate and reliable.

Indo-China

Until 1934, forecasts and estimates for Indo-China were done by the administrative authorities. Since that year the work has been taken over by the Indo-China Rice Office, which, through technical methods, has been able to attain very precise results, especially in Cochin China and Tonkin.

The forecasts are made from information given at first by the villages and verified on the spot by agents of the Rice Office who centralize and check the statements. The first land forecasts for the rainy season are published in December. They are revised according to further developments in the rice fields, especially in regard to crops sown but subsequently destroyed, for example by floods. Thus, only areas that have been in rice at the end of the season are recognized in making definite estimates of production.

As regards the determination of the yields, every province is divided according to the richness of its soil and its water control into a certain number of "specific zones," usually two or three for each province, which include several villages. In each specific zone, a village type is established. During the harvesting period, plot experiments are made by the agents of the Rice Office for each category of rice (early, medium, and late), the number of experiments depending on the area under cultivation of the various types cultivated in each specific zone represented by a village type. In Cochin China, an average of 5,000 experiments are made every year. The threshed grain obtained from the experiments of each category of the varieties is dried and weighed, and the calculated average of the weight of each category is the basis for estimating the yield per hectare and is accepted as the average yield of the category concerned for the entire specific zone. All the figures thus obtained are multiplied by the corresponding area figures and the total production is obtained by addition.

A coefficient for correction is calculated if certain factors, such as rain, cause a deficit in the paddy which has been placed in heaps in the fields after harvesting. The exportable surplus is obtained from the estimated figure by subtraction of the local consump-

tion figure. After ten years of experience, it is observed that this method supplies figures that are exact within 3 to 5 percent.

Indonesia

Prior to the war, monthly surveys were published covering the whole of Indonesia with reference to the harvesting and planting of rice and other crops.

For Java, Bali, and Lombok, these reports contained complete figures on harvested and planted areas and on crop failures as of the end of each month. In these islands, the areas cultivated have been carefully measured. Every month the figures for each village were submitted to the district head of the Civil Service, who in his turn transmitted them directly to the Central Bureau of Statistics at Batavia. These monthly surveys also contained data on the position of the planting and on harvest results, which were collected by the Agricultural Extension Service and submitted to the Central Bureau of Statistics.

For the outer islands (except Bali and Lombok) no exact data are available as to the areas planted. The monthly surveys of harvest and planting, therefore, contain only rough estimates of harvested and planted areas. These data, together with the reports on the condition of the planting and on the harvest results, are collected by the Agricultural Extension Service and further submitted.

In Java, Bali, and Lombok an accurate estimate of the total production of *sawah* paddy is made shortly before the completion of the harvest. In addition to the data covering harvest and planting, these production figures obtained from the so-called "land-tax fields" are used in calculating these estimates. The yield of these fields is annually determined for calculating the land tax, which is revised every decade. There are approximately 19,000 such fields (one upon every 177 hectares), each covering about 0.2 hectares. As they are systematically distributed over all fertility classes, their average yield is regarded as representative for all *sawah* fields.

The first estimate of the Java harvest yield is made in the month of July when a considerable proportion of the planted fields have already been harvested and many production data have already been collected. The second estimate is made in October and the third in January. It has been found that the first estimate deviates only 1 to 2 percent from the final figures.

Burma

Before the war the system of forecasting in Burma was accepted as one of the most effective in Southeast Asia. The forecast was primarily a forecast of probable exports, not of production. It was arrived at by the application of a statistical formula to the previous exports, the matured area (derived from a meticulous system of annual crop marking on maps on a scale of 16 inches to the mile—equivalent to approximately 40 centimeters to the kilometer), and a condition figure derived from detailed local enquiry by experienced officers. Unfortunately the break during wartime in the continuity of the statistics has destroyed the value of the formula and more primitive methods have had to be reverted to. The forecast is, however, still based on the same meticulous data.

In recognition of the problem involved, the Study Group *recommends*:

- (1) That each country which has not already done so should initiate improvements in its system of crop forecasting and estimating as soon as practicable so that periodical and timely reports can be issued as to area, size, and condition of each crop in each important producing section. In so doing, each government may desire to designate a commission of statistical experts to examine the crop forecasting and statistical methods now employed and to develop and test the improved methods recommended;
- (2) That FAO should examine the methods adopted in different countries for recording statistics of area and for estimating standard or normal yields and total production, as also the methods that have recently been evolved in different countries for improving the accuracy of these statistics, and should recommend as far as possible some uniform system that could be advantageously used in different countries; and
- (3) That, as a guiding principle, sampling methods should be employed for such purposes, in order to attain a wider coverage and greater accuracy in results. In recommending the employment of sampling methods, the Study Group is well aware of the many technical problems involved in applying these methods, especially the problems of selecting a representative sample and applying the results nationally.

MARKET INTELLIGENCE

Improvements in the dissemination by governments of market information, such

as wholesale and retail prices and production and area estimates, have been found to be another effective method of improving the marketing of rice. The following description of methods used in some Asiatic countries may be useful to other governments dealing with the problem of efficient dissemination of market intelligence.

Indo-China

Before the war, the Association des Exportateurs Français d'Indochine published a monthly review which supplied all information concerning the following points: (1) statistics and forecasts of harvests established by the Indo-China Rice Office; (2) situation of the local market; and (3) situation of the world market.

The information supplied was very precise, and gave the world prices not only of rice but of other cereals, the situation of world stocks, and the details of yields in the principal producing countries. As soon as circumstances permit, these publications will be revived.

Burma

Before the war, local market intelligence was systematically published in Burma by commercial concerns, and, as a result, many rice growers knew the current market price of rice within 48 hours of publication. However, many of these commercial enterprises were dislocated during the war. Pending the restoration of normal trade, the Government of Burma is collecting and disseminating market intelligence by means of the Agricultural Projects Board and the information services.

Siam

In Siam, the Ministry of Agriculture and the Ministry of Commerce collect and disseminate all market information on rice. The Ministry of Agriculture collects and distributes the price data on paddy in the provincial market centers, and the Ministry of Commerce, on prices of paddy at central markets such as Bangkok. The Ministry of Agriculture also maintains an extension service staff at approximately 80 localities to give rice growers advice and guidance. The Ministry of Commerce sponsors an organization of market reporters in Bangkok that collects daily rice prices at rice mills and commission houses. In addition, a rice trading company has been organized, known as the Thai Rice Company, which gives valuable information on prices to rice grow-

ers and buys and sells in the market to help stabilize prices.

China

The Market Intelligence Service of the Chinese Government supplies information daily to the Ministry of Food on food conditions from 216 important cities. Reports are published monthly on market prices, including price quotations on first and second grades of polished rice and paddy from approximately 1,600 locations and data on price fluctuations from 32 major cities.

India

In India, wholesale and retail prices of important staple commodities are collected by districts and published in the *Provincial Gazette*. As they are not based upon a uniform quality of rice, discrepancies appear in the statistics. In addition, prices of rice at certain important trade centers are collected by the government and published in the *Indian Trade Journal*, which also contains three forecasts on rice each year for all of India. A weekly radio report on rice prices in different markets of India is broadcast from Delhi by the Central Agricultural Marketing Department.

The Rice Study Group has recognized that many problems are associated with the establishment and management of an efficient system of collecting and disseminating market information and that much more study is necessary. It therefore *recommends*:

that FAO should arrange for the collection, collation, and dissemination of the necessary statistical information on planted area, yields, production, prices, stocks, and trade movements, particularly from the point of view of international trade.

AGRICULTURAL CENSUS AS A BASIS FOR CROP ESTIMATING

The Study Group has noted that FAO is sponsoring the 1950 world census of agriculture. This agricultural census, if taken in accordance with improved census methods, will provide the enumerative basis essential for establishing a representative sample from which periodic crop estimates can be projected. The Study Group, therefore, *recommends*:

that all governments that can do so make preparatory provisions immediately for (a) taking an enumerative census of agriculture within the next three years, and (b) that, in preparation for such census work, each govern-

ment should select a group of key census officials and give them at least six months' intensive training in modern census methods and techniques.

It is suggested that FAO could be of great service to the governments in making preparations for their next agricultural census by arranging with one or more institutions in Asia for a series of census training courses to be given during 1948/49. FAO should co-operate with those institutions in developing the content of these courses, to assure their practical application to the census program.

REHABILITATION AND DEVELOPMENT OF TRANSPORTATION SYSTEM

Further improvement in the marketing of rice can be accomplished by the provision of adequate transportation facilities.

Before the war, insufficient transport in many countries in South and East Asia had a detrimental effect on prices paid to producers and on the efficiency of rice distribution from the producing centers to the consumers. The limited transportation facilities available in many parts of the region have been further depleted by the war. The present difficulties in the various countries are summarized in the following paragraphs.

Siam

The railway system in Siam was damaged to a great extent by the war. Although rehabilitation has progressed with considerable help from abroad, Siam needs further assistance in supplies of rail wagons, materials for reconstruction of bridges, and workshop installations.

Because of its good timber resources, Siam can cope with rehabilitation of water transport, but it needs supplies of dredger repair parts and new dredgers for digging out the silted river channels and especially the bar at the mouth of the Chao Phya River south of Bangkok.

Siam lost all its ocean steamers and 60 percent of its coastal ships during the war, and present supply conditions make replacements extremely difficult to obtain.

It also needs materials and machinery for construction of new trunk roads and feeder roads, especially in rice-producing areas, and for maintenance of existing roads. A large number of motor vehicles are also needed to bring the rice to mills from the producing areas.

Railways carry only one-third of the mar-

ketable rice surplus, and the remainder must be moved by water transport, but there are seasonal limitations to water transportation because of low water levels during certain times of the year. It is, therefore, impossible to arrange for the regular spacing of the movement of paddy and rice in Siam throughout the year.

Burma

Burma's communication system was completely disrupted by the war. Its river fleet of power-driven vessels was almost completely destroyed and its railways were wrecked. Restoration of the railways is proceeding rapidly, but there is still shortage of locomotives, rolling stock, and materials, and it will take several years to replace a number of important bridges. The restoration of the river fleet is necessarily proceeding more slowly, and the movement of rice is still impeded by a shortage of suitable power vessels and cargo barges. There is also a shortage of country craft of the type suitable for the conveyance of rice. As some two-thirds of Burma's paddy and rice and consumer goods have to be moved by water, the speedy restoration of water transport is of the greatest importance.

China

In China, a large percentage of the rice transportation is carried on by human labor, animal labor, and river junks. Nearly 25 percent of the selling price of rice results from the cost of transportation. China needs finances and materials for the improvement of river transportation as well as of railways and highways.

India

In India, paddy and rice are transported mainly by railways, and locomotives are now needed to replace those that were sent out of the country during the war. Water transport is cheaper than rail but is possible only in certain parts of the country. Dredging of rivers and canals is of national importance.

Indonesia

In Indonesia, the transport system for rice was damaged considerably by the Japanese occupation. There is a shortage of locomotives, other railway materials, and trucks. For very important interinsular shipments of rice, there is a great need of steamers.

Indo-China

The provinces of Cochin China that have an exportable surplus of rice are situated east of the river Sanai (province of Transbassac, and at a distance varying between 200 to 400 kilometers from Saigon).

Transport of rice is mainly by water—canals and rivers. The producers assemble their harvests at collecting centers by means of little sampans, which are of a tonnage varying between 1 to 20 or 30 tons. The paddy is loaded onto junks of a heavier tonnage (100 to 300 tons). The junks are then formed into a convoy (usually in groups of ten) and towed to Saigon by a tug.

The sampans belong to the cultivators. This kind of transport was not affected by the war, but sampans cannot be used for long-distance transportation.

The river junks belong for the most part to Chinese firms although some European firms own a number of them. This type of transport was very badly damaged during the war; in fact, over 80 percent of the river junks in Indo-China have been completely destroyed. The remaining junks still afloat are badly in need of repairs, and great efforts are being made to rehabilitate them.

Tugs and steamboats belong mainly to Chinese marketing societies and in some cases to French societies. This flotilla was nearly completely destroyed. At the moment of the capitulation of Japan there were only two tugs left in Cochin China. At present the number has increased to ten, which ensures the transport of only 10,000 tons of paddy per month to the milling centers of Cholon. Before the war the amount of paddy brought down for milling during the months of March, April, and May averaged 400,000 tons per month.

It must also be pointed out that canals used in transporting rice have not been kept in good order. Transportation is obstructed by various objects, such as junks and tugs which have been blown up or sunk. The cleaning of these canals is a very slow process because of inadequate power machinery.

Cochin China now has a flotilla which is about 15 to 20 percent of its prewar strength, and 50 percent of its network of canals is unsuitable for navigation.

Although some rehabilitation of the transport systems has been carried out in South and East Asia, various types of equipment are urgently needed for improving all sys-

tems of rice transport where these have been seriously damaged directly or indirectly by the war and where the cost of transportation is at present very high.

The Rice Study Group *recommends*:

that each country inform FAO of its detailed requirements, for dissemination to those countries that have facilities to aid in rehabilitating transportation, and that FAO submit this information to the United Nations Economic Commission for Asia and the Far East for consideration.

REHABILITATION AND DEVELOPMENT OF RICE MILLING

Because of the dislocation of the rice industry by war, certain countries are finding it difficult to get spare parts for milling machinery. The Rice Study Group *recommends*:

that each country furnish FAO with its detailed requirements, for dissemination to those countries that have facilities to aid in rehabilitation of mills, and that FAO submit this information to the United Nations Economic Commission for Asia and the Far East for consideration.

The location of rice mills is not an important problem in the producing countries. However, if new mills are to be erected in such countries, it is desirable that these should be located in the center of producing areas and not concentrated at the exporting points.

GROWERS' CO-OPERATIVES AND OTHER MEASURES TO IMPROVE MARKETING AND CREDIT

The problems of extension of the growers' marketing season and control of seasonal price fluctuations through co-operative organization and credit have been considered by the Rice Study Group. Lack of finance and credit results in rushing the paddy to the market early in the harvest season. Most of the cultivators in Asia are constantly in a short cash position and their produce is therefore sent to the market as soon as possible. When prices go up later in the year, the cultivator has nothing to sell.

In *India* co-operative marketing of agricultural produce has made considerable progress. After a period of trial and error, a better co-ordinated method has been introduced in which "village primaries" finance all agencies and marketing societies in certain areas. This system known as the

Controlled Credit System was first applied in Madras and it is being tried out in other provinces. Cultivation finance is authorized on the basis of anticipated needs to avoid delay, but actual disbursements are made only as and when needed and their application is watched and rigorously controlled by making it a condition that credit can be given only if the surplus is disposed of through the marketing society with which the village primary is affiliated, the societies securing control over sales. Large-scale federations of producers' co-operatives are working with considerable success in provinces like Madras. These federations pool all the paddy of the producers, grade it, and sell it to the best advantage of the producers. After the introduction of controls and the fixing of prices, these institutions purchase outright the members' produce and sell it to the Grains Purchase Officer sent to the deficit areas. They also act as agents of the various consumers' organizations in the deficit areas.

A third type of co-operative organization recently started in Madras is the producers-cum-consumers' co-operative, consisting of landlords and cultivators in a compact area. It procures all the surplus paddy of the producers, mills it in the various mills with which the societies have entered into contract, and sells the rice through ration shops run by them. Any surplus left over is transported to other deficit areas in the quantities and at the times required.

In *Australia*, paddy is marketed by the growers themselves through the Rice Marketing Board, on which they have a majority representation. The Board holds sole rights for acquisition and marketing of paddy; the growers are paid a cash advance by the Board immediately on delivery of the crop; and the paddy is pooled and sold directly by the Board to millers in Australia or for export overseas. At the end of the marketing season the total proceeds, less charges of administration, are paid to growers.

In the *Philippines*, the establishment of warehouses and of banks lending money on the basis of warehouse receipts has reduced seasonal price fluctuations by 33 percent. As in several other countries, there have been many disappointing results with co-operative societies in the Philippines as a result of incompetent management.

In *Siam*, there are over 5,000 co-operative societies. They provide credit and marketing facilities and investigate market condi-

tions. There is also a central co-operative bank to finance these societies.

The co-operative system in *Japan* took a definite form in the year 1944, when an act was passed with a view to assisting small farmers to safeguard their interests by means of mutual aid. The legislation was based on the co-operative movement in England, but the outstanding characteristic of the Japanese system was that it came into existence through government guidance instead of evolving from a spontaneous popular movement among the farmers.

The original co-operative legislation in Japan expanded many times, and its functions came to include co-operative purchasing, selling, and credit. Membership in these organizations was voluntary.

During the 1930-1940 period the Government of Japan exercised an increasing amount of control over the co-operative association, and early in 1940 it finally took over complete control of the co-operatives by merging them with the agricultural associations. The combined organization was called the National Agricultural Association and membership in it was made compulsory. At present, the National Agricultural Association is in the process of reorganization in order to re-establish the voluntary co-operative system and eliminate government domination.

In *Indo-China*, the system of co-operatives was instituted before the war and great progress was made. During the war, the government had the monopoly for the purchase of paddy. The producers were paid a fixed price, which was valid for one year. This action has retarded the further growth of co-operatives in the country.

In *Malaya*, it is recognized that the best method of improving the economic condition of the cultivator is through the widespread application of co-operative principles. All possible steps are being taken to rebuild and expand the progressive prewar organization, and it is believed that there is a great future for co-operation in the country, especially in regard to the marketing of produce.

In *China*, storage systems both for price stabilization and famine relief date as far back as the Han Dynasty. Depositing storehouses were established in 1929 through the efforts of the Farmers' Bank of Kiangsu Province. Later the same practice was instituted in other provinces. In 1936 the Board of Agricultural Investments began

to make a network of storehouses throughout the country.

The storage facilities continued in operation throughout the country until the beginning of the war. The whole storage system in China suffered greatly from war devastation. Storehouses at present are either under the Ministry of Food or operated by the Farmers' Bank of China. Those under the Ministry of Food have a capacity of over 54 million hectoliters and are located in the rice-producing centers. Those run by the Farmers' Bank of China are used for depositing and safekeeping of foodstuffs. Some of these are operated by co-operatives in connection with their agricultural loan business. The number of such storehouses is rather small, but it is planned to increase the number considerably in the near future.

According to present plans of the Chinese National Government, the storage system will be strengthened in the future and operated by (1) the National Government, (2) provincial governments or public societies, and (3) monetary institutions and co-operatives.

The National Government has a five-year plan for the construction of central storehouses in all important producing centers of 14 large districts, with branches and regional storehouses spread over the districts. At the end of the five-year period, it is expected that storage facilities will be sufficient for about 2 million tons of rice, which is one month's consumption for the whole Republic.

In *Ceylon*, co-operation has developed with great rapidity in the last decade and now covers a large percentage of both rural and urban population. The many societies provide assistance to cultivators over a wide range of activities, and it is considered that co-operation will prove a great boon to the country.

In *Ceylon*, there are two government-sponsored banking institutions which give credit and loans for agricultural purposes: (1) the State Mortgage Bank, which gives credit on the mortgage of lands only; (2) the Agricultural and Industrial Credit Corporation, which gives loans on primary mortgages of immovable as well as movable property, including crops. Both banks give long-term loans at comparatively low rates of interest. The Credit Corporation, which was inaugurated in December 1943, is endeavoring by propaganda to facilitate loans for paddy cultivation, food production of all kinds, and livestock production. It pays

special attention to the peasant classes for these purposes by agreeing to small loans and accepting village titles to land which could not ordinarily be accepted by a commercial bank.

There are also co-operative credit societies, mainly intended to cater to the needs of the small agriculturalist. At the end of April 1945 there were 1,697 such societies with a membership of 49,638 and a working capital of Rs. 2.8 million. The total amount of loans issued by them during 1945 was Rs. 3.1 million. The rate of interest varies from 6 to 9 percent. Over 27,000 such loans amounting to nearly Rs. 1.6 million were issued in 1945 to members of societies for the cultivation of their lands, mainly for food crops.

In addition to the provision of easy credit facilities through these co-operative credit societies, a scheme of subsidized food production through co-operative agricultural producers' societies has been undertaken in the north of Ceylon. A sum of Rs. 174,000 was provided for the purpose of distributing seed to farmers through the societies of which they are members. The arrangement is that when the crop is harvested, the government will purchase it at a guaranteed price.

The most conspicuous co-operative development during the last few years has been the remarkable expansion in the co-operative consumer movement. From a mere 38 consumer societies in 1942, the number has soared to over 4,000 retail societies catering to nearly 4 million consumers. There is now practically no village or town in Ceylon which does not have its own co-operative society. The total business done by these societies in 1945 amounted to nearly Rs. 120 million. Their paid-up share capital amounted to about Rs. 6 million and their net profits were over Rs. 3 million.

In addition to the retail distribution through the co-operative stores, arrangements were made in 1945 to organize on co-operative lines the wholesale distribution to co-operative societies. Co-operative wholesale unions have already been established.

After a period of trial and error, the co-operative movement in *Indonesia* is growing steadily. In 1930 there were only 89 registered co-operative societies. During the decade 1930-40 this number gradually increased to 624. The membership of each co-operative averages about 100. All regis-

tered co-operatives are organized in a number of local organizations and in one national organization. Most of them are credit co-operatives. An increasing number of this type is engaged in storage of paddy with the purpose of selling it at higher prices than can be obtained immediately after the harvest. The farmers can get an advance when they deliver their paddy to the society. Other types of co-operatives are producers' co-operatives, consumers' co-operatives, and co-operatives for amortization of debts. Most of the co-operative societies are of the mono-purpose type. Besides these registered co-operative societies, there are many hundreds of unregistered ones. Although co-operative societies have an increasing share in the providing of farm credits in *Indonesia*, the government credit institutions are still by far the most important credit institutions for the farmer. There are three types of these institutions: the general peoples' credit banks, the village money banks, and the village paddy banks. The peoples' credit bank has 98 local offices spread over the whole of *Indonesia*. The amount of money loaned amounted in 1940 to 29 million guilders, with an average loan of 44 guilders per person. There are about 7,500 village banks which in 1940 loaned a total amount of 23 million guilders to about 1 million people. There are about 5,500 village paddy banks. The total quantity of paddy involved amounted to 110,000 tons in 1940.

The Study Group has come to the conclusion that co-operative marketing, coupled with an efficient credit system, is one of the best ways of helping the farmer improve his position. It is agreed that, although the co-operative organizations in many countries show considerable progress, more study of methods is desirable. Detailed information on the co-operative system in countries where farmers' co-operatives are in an advanced stage would be of great help, and FAO could organize the collection and dissemination of all such information.

The Rice Study Group *recommends*:

- (1) that all countries should pay due attention to the development of co-operative marketing systems which must be considered as a great help in improving the marketing conditions for the farmer; and
- (2) that more information is needed on the systems of co-operative organizations in countries where they are in an advanced stage of development, and that FAO should help in collecting and disseminating this information.

Chapter VII

PRICE POLICIES

NATIONAL PRICE POLICIES

JAPAN and Indonesia are the first Asiatic countries known to have adopted statutory measures for controlling and stabilizing rice prices in the prewar period. In Japan, statutory controls were introduced as early as 1921. These were aimed principally at maintaining the desired balance between domestic production and marketing of rice. Between 1931 and 1936, several other enactments were introduced with a view to protecting domestic rice prices against the influences of low prices of imported rice and to building up emergency reserves. In Indonesia, the domestic prices were maintained at the desired levels by controlling imports and imposing import duties.

During and since the war, practically all the rice-eating countries of the world have been obliged to lay down legislative measures to check the abnormal rise in price caused by reduced production, dislocation of transportation, inflation, and other factors. In order to maintain a balance between demand and supply and to keep the rice prices within reasonable limits, ceiling prices have been generally prescribed and necessary controls instituted on imports, exports, and internal distribution.

The legislative measures taken in the prewar period were occasioned by excessive supplies and falling prices, and those of the war years by temporary shortage of supplies. The problem with which the world is faced now is rather different, although the scarcity condition created by war may continue for some time. The future price policies of different countries are likely to be guided by two primary objectives: (1) to promote production to meet the shortage caused by the war and the expanding demand resulting from the increase of population and from a higher nutritional standard, and (2) to raise the standard

of living of both farmers and consumers to a reasonable level. These twin objectives, in the words of the FAO Conference (Second Session), can best be achieved by stabilizing agricultural prices "at levels fair to producers and consumers alike."¹

Although no concerted action has so far been taken in any country to stabilize rice prices at reasonable levels, as part of a long-term policy, several countries have announced their willingness at the present time to purchase paddy and rice at pre-declared prices with a view to stimulating production.

For instance, in Burma the government has promised to buy all paddy offered to it at certain established buying stations at Rs. 300 per 100 baskets of 46 lbs. each at ports and Rs. 285 elsewhere. These prices to the grower are directly related to the price at which the Government of Burma buys rice ex hopper. The "on costs" from hopper to ship have been carefully calculated. For paddy bought at the prices mentioned above, the f. o. b. cost, including millers' profits but not including any marketing profits, was originally estimated at 25 pounds sterling per ton. This was found to be an underestimate—a figure of 27 pounds a ton is now considered more accurate. The difference between this figure and the export price of £33 6s. 8d. f. o. b. is the result of a carefully considered policy. In the first place, it includes a reasonable margin of profit for the marketer and an allowance for certain overheads not included in the calculation of f. o. b. costs. In the second place, it makes allowance for specific expenditure by the Government of Burma itself in connection with the production of the crop. This expenditure includes a direct payment of about Rs. 2 crores

¹ FAO, *Report of the Second Session of the Conference*, Washington, December 1946, pp. 5 and 49.

(1.5 million pounds) as a subsidy for extension of cultivation and about Rs. 3 crores (2.25 million pounds) in loans to farmers. In the third place, the difference is due to a deliberate policy of the Government of Burma, similar to that of the Government of India, to hold the price to the local consumer at a reasonable figure. The final price was determined by applying the above considerations to the prices charged by other exporting countries. This is justified on the basis of inflation control, since, if it were not for control of internal prices and of exports, export prices would have inevitably risen to this level and internal prices would have risen with them. Any profits remaining with the Government of Burma are intended to be utilized for the rehabilitation and expansion of rice production and of the services subsidiary or essential to it.

Apart from the need of guaranteeing a remunerative price to producers to promote production during the transitory period, the question of stabilizing rice prices on a long-term basis is of considerable importance. In most of the countries of South and East Asia, rice crops depend largely on the vagaries of rainfall and the crop area and yields vary considerably from year to year. The crop is also subject to damage by pests and diseases, which may reduce returns to cultivators to a point below the costs of production.

If the cultivator is to improve his economic position, he should be assured of a remunerative price for his produce. A committee of experts appointed by the Government of India to examine the question of price policy for that country came to the conclusion that the guarantee of an assured market at a remunerative minimum price to cultivators constituted the most direct and effective form of stimulating production. This committee also recommended that, as a corollary to a fair price to the producers, the government should prescribe a fair price to the consumers.

Since the agricultural economy of most countries in South and East Asia depends primarily on rice cultivation, the stabilization of rice prices would not only introduce an important element of stability in agriculture as a whole but would also promote stability in other spheres of economic life because of the significance of rice as an income-generating force in the national economy and as an important item in the consumers' budget. Further, as farmers constitute about 80 percent of the total popula-

tion of these countries, the maintenance of farm income at a satisfactory level would provide a large market for the products of local industries and would encourage their development.

STABILIZATION OF INTERNAL PRICES

The Rice Study Group has recognized the desirability of introducing effective measures for stabilizing rice prices on a long-term basis. There are several different points of view regarding the methods and standards that would give the most equitable results and still be capable of efficient administration and control. Some believe that minimum prices or guaranteed prices to producers should be based on costs of production; in arriving at such prices, a suitable margin should be allowed over and above the costs of production to permit the producers a decent standard of living. They argue that the cost-of-production basis would enable governments gradually to improve the living standards of producers, because their calculations would not be based on a historically uneconomic price relationship.

Others maintain that, since the calculation of the costs of production is a very complicated affair, the minimum prices might be fixed on a parity price basis. The delegates who proposed guaranteed prices on the basis of costs of production were of the opinion that, while the parity basis has been found useful in some countries in helping maintain farmers' income at desired levels during periods of depression, the principle could not be usefully applied in countries where the farmer has a low standard of living, since the aim is a gradual increase in production and in consumption in order to raise the standard of living of the masses. The parity basis could, however, be adopted for fixing the minimum prices until such time as the necessary data on cost of production were available, but the costs of production would be the proper basis in an expansionist economy for fixing cultivators' prices on a long-term basis.

It was noted also that a guaranteed price to producers presumes close government control over both export and local prices and probably the entry of the government concerned as the principal trader in rice. The desirability or necessity of maintaining such controls as a permanent policy was questioned by some.

As an aid to further examination of these questions the Rice Study Group requests that FAO prepare a memorandum on this

subject, including a list of items that should be taken into consideration in calculating production costs for rice.

The Study Group recommends

that information regarding national experiences with guaranteed prices and an account of the basis on which they were calculated be submitted by the countries to FAO for dissemination to all member nations.

In connection with the calculation of production costs for a particular country, opinions differed as to whether production on marginal lands should be taken into account, since its inclusion might raise the internal and international prices abnormally and tend to set into operation the vicious circle of higher costs and higher prices.

FAIR PRICES TO CONSUMERS

Besides guaranteeing a fair price to the producers, it was suggested by some that the prices to consumers in each country should not be allowed to go above a certain maximum, so that they might always be within the reach of the ordinary consumer. The maximum prices in each country should, therefore, be correlated with the general cost of living. In fixing a maximum ceiling price, due allowance should be made for costs of transportation, storage, handling and merchandising charges, profits, and related factors. The prices in a country, it has been argued, could be allowed to fluctuate between the range provided by the minimum and maximum statutory limits. Besides other considerations, this would be helpful in maintaining normal price parities between the different parts of the country concerned and also among competing crops.

PRICE STABILIZATION AND FAMINE RESERVES

The Rice Study Group has reviewed the recommendations of the Preparatory Commission on World Food Proposals concerning the creation of famine and price stabilization reserves.² It has also had before it a thought-provoking paper on the subject of international reserve stocks presented by a subcommittee of this Group. (See Appendix D, page 51.) While it is believed that the principles outlined by the Preparatory Com-

² FAO, *Report of the FAO Preparatory Commission on World Food Proposals*, Washington, February 1947, p. 24.

mission are generally applicable to rice as a basic food and to the major rice-producing and rice-consuming countries, it is the considered judgment of the Study Group that world supplies of rice will be far below reasonable consumption requirements for at least five more years. This raises many practical problems and policy questions which, it is believed, require special attention by individual governments and further study by FAO. Interest in promoting further examination of this subject does not reflect disagreement with basic aims. It is recognized that the stabilization of prices is of the greatest importance to the prosperity of agriculture and it is agreed, therefore, that every measure intended to promote such stabilization should be most carefully examined.

INTERNATIONAL PRICE AGREEMENTS

The subject of international price agreement was also discussed by the Rice Study Group. It was generally recognized that the rice markets of the world are at present in a highly unstable condition and that the range of prices from one market to another cannot be explained with reference to normal factors. Under these circumstances, it has been agreed that the earliest possible achievement of greater stability in international rice prices is highly desirable. The difficulties in this respect, particularly with regard to the lack of necessary data and the uncertainty of the monetary exchange situation, are, however, recognized. Accordingly it is urged that before any definite measures are taken to attain these objectives, FAO or other appropriate international organizations should take early steps to organize and conduct further basic studies on:

- (1) the changing pattern of supply and demand factors, market and trade conditions, transport and shipping situation, and consumption and nutritional requirements of rice;
- (2) the present-day price structure of rice, and ways and means of co-ordinating the price policies of the surplus and deficit countries; and
- (3) the economic problems relating to stabilization of rice prices, including the analysis of stabilization technique through a system of maximum and minimum prices.

Chapter VIII

INTERNATIONAL TRADE IN RICE

PREWAR TRADE

INTERNATIONAL trade in rice developed more or less freely before World War II and approached 8 million metric tons in 1939. The five net exporting countries in South and East Asia—Burma, Siam, Indo-China, Korea, and Formosa—accounted for 94 percent of the prewar trade in rice. The bulk of the exports from Siam and Indo-China were consigned to Hong Kong and Singapore and largely re-exported to various destinations. Prewar exports from Korea and Formosa to Japan were domestic transactions within the Japanese Empire. The exports from Burma and Siam went mainly to the rice deficit countries in Asia but they also went to Europe and other areas. A high proportion of the supplies from Indo-China went to France and her colonies and the balance to East Asia. Indonesia and the Philippines had virtually attained self-sufficiency in rice in the years immediately preceding the war. Although China and India have been by far the most important producers of rice, they have always needed large imports to provide the marginal supplies of rice in deficit areas. Malaya and Ceylon were the other leading importers of rice, Japan's imports being drawn almost exclusively from her prewar colonies.

The prewar situation of individual importing and exporting countries is briefly summarized in the following paragraphs:

India was a large producer as well as a large importer of rice. Total imports varied from 1.5 to 2.5 million tons a year. Although these were small in comparison with domestic production, certain parts of India were dependent on imports for 60 percent of their requirements. Roughly 90 percent of the imports came from Burma and the balance from Siam and Indo-China. The imports from Burma were of three

kinds: raw rice, parboiled rice, and broken. A shortfall in the relative proportion of the supplies of broken from Burma was frequently supplemented by imports of broken from Siam and Indo-China. In prewar years India exported between 200,000 and 250,000 tons of home-grown rice to Indian settlers in Ceylon, the Persian Gulf, and South and East Africa, and small quantities of a special variety went to Europe.

China imported on the average 1 million tons of rice from Siam, Indo-China, and Burma before the Sino-Japanese war in 1937. A substantial part of the Chinese imports came from Hong Kong, which had a large transit trade in rice with China. The imports were normally intended for certain deficit areas in South China.

Malaya met more than 60 percent of its consumption requirements by imports. A considerable proportion of the rice imported into Singapore was re-exported. The prewar imports averaged about 0.6 million tons of which the bulk came from Siam and the remainder largely from Burma.

Ceylon depended for 70 percent of her consumption requirements on imports. The total imports averaged 0.5 million tons a year and came mainly from Burma, Siam, and India.

Burma was, before the war, the largest exporter of rice. Its annual exports varied from 3 to 3.6 million tons in terms of rice and rice products. Roughly 56 percent of rice produced in the country was exported. India absorbed roughly one half of the total exports and Ceylon, Malaya, and Indonesia accounted for nearly a quarter. Although the trade with European countries was smaller in volume, Burma attaches great importance to these markets for sale of quality rice.

Siam exported from 1.2 to 1.5 million tons a year, or approximately 50 percent

of the total production. The main outlets were Singapore, Hong Kong, China, and Europe. Some shipments also went to Latin America.

Indo-China annually exported from 1.5 to 1.6 million tons of rice and rice products, or roughly one-third of its total production. The chief outlets were France and its colonies, China, Indonesia, India, and the Philippines. These markets were served mainly through Hong Kong.

POSTWAR SITUATION

The Japanese occupation of the rice-exporting countries of Southeast Asia led to a complete dislocation of the rice trade. The critical shortage of rice in the postwar period may be attributed mainly to the reduction of rice acreage in the surplus-producing areas of Southeast Asia and partly to the increase in the rice-eating population. There has been a considerable increase in production in the Western Hemisphere, but this has been much too small to offset the decline in production in the East. Not only has Indonesia again become an importer of rice, but Korea for the first time became a rice-importing country in 1947. Since the war, the Philippine Republic has obtained supplementary imports from the Western Hemisphere. The present situation in the principal rice-trading countries is discussed in the two sections which follow.

Exporting Countries

During the war, the area under rice in Burma decreased sharply from 5.1 million hectares to about 2.0 million hectares, and production declined to the level of normal internal requirements. By various measures the area has been increased to 3.3 million hectares in 1946/47. No special measures have been found necessary to procure the maximum amount of rice from the growers for export. The attractive prices have, on the contrary, caused excessive selling in some cases. The declaration of stocks and movements of rice is compulsory and the government has full powers to requisition stocks.

During the war and subsequently, rice production in Siam has declined and the exportable surpluses have accordingly been reduced. In connection with IEFEC allocations, the Siamese Government has passed laws enforcing procurement in the main producing areas, and has instituted rationing in Bangkok and other towns, particu-

larly along the Malayan border. The ration in the Malayan border towns is intended to prevent smuggling, as well as to conserve as much rice as possible for export.

The exportable surplus of Indo-China has been greatly reduced during and since the war, owing to internal difficulties.

In all three countries, the available surpluses are placed at the disposal of the IEFEC for allocation to the various deficit countries. International trade in rice is at present on a government-to-government basis.

Importing Countries

After the Bengal famine of 1943 the rice situation in India again became critical during the latter half of 1946 and, in spite of increased production, India was still faced with a shortage of over 2 million tons in 1946/47. Localized famines in the rice deficit areas in China have been reported in the postwar years. Chinese import requirements are at present higher than the prewar level. Production in Formosa, which is now a province of China, has declined since the war, and rehabilitation will take some time.

The rice shortages in Malaya, Ceylon, and Hong Kong, areas which are largely dependent on imports, have been acute in the postwar years. The Philippines also requires substantial imports during the rehabilitation period. Internal difficulties and decreased production in Indonesia have created localized deficit areas which now rely on imports. Owing to cessation of normal cereal imports, short crops, lack of fertilizers, and increase of population, South Korea has now become a deficit area. Normally, Japan requires large imports, but since the war it has received no supplies of rice from other areas.

FUTURE PROSPECTS

Long-term export prospects and requirements of rice are difficult to forecast because of many uncertain factors in the situation. Some countries have planned development projects that will bear fruit in the not too distant future, while other countries, particularly Indo-China and Indonesia, are experiencing internal difficulties that make an appraisal of the future situation highly conjectural. The views of members from various countries on future trends are given in the following paragraphs:

Views of Members

It is expected that the planted area in Burma will increase to 4.2 million hectares

by 1948/49. Substantial quantities will then be available for exports. Subsequent recovery will be slower and it will certainly take several more years before the prewar level is reached. As a result of improvement of the yield-per-unit area, however, production may be brought up to the prewar level faster than the restoration of the prewar area.

Siam expects to reach the prewar level of production within four years. Assuming that the projected irrigation and flood control schemes have been completed in seven years' time, the irrigated area under rice will have been increased by .5 million hectares, bringing the total area under irrigation to about 1.25 million hectares. The resulting increase in production is expected to approximate 1.7 million tons of paddy.

Indo-China is expected to reach the prewar level of rice exports in 1954. The exportable surplus may be increased over that of prewar if the program for irrigation and application of fertilizer is realized.

In view of the program for mechanization, irrigation, flood control, increased acreage, and intensive cultivation of rice, the Philippines hopes to become self-sufficient in the course of the next five to eight years.

For Java, which is the main rice-growing area of Indonesia, there is no reliable information available regarding the position of irrigation works and the general agricultural condition in the interior. Therefore it is not possible to give any views on the future trade developments of that area. So far as Sumatra, Celebes, and Borneo are concerned, there are promising prospects for the expansion of rice acreage and yield. The increased production of these areas may reduce the import requirements of Indonesia as a whole.

Production in Formosa and other provinces of China has declined for the lack of fertilizers and machinery. When the fertilizer, irrigation, and drainage situations are improved, production in China (including Formosa) may increase sufficiently to meet domestic requirements. This cannot be accomplished, however, in less than a period of from three to five years.

Production in India may increase considerably when the various irrigation and other projects materialize; but in view of the increase in population and the present low level of consumption in deficit areas, the

import requirements will continue to remain high for many years.

After the rehabilitation period, the export surplus of Korea will be smaller than before the war. Japan will be dependent in the future on other areas for its rice supplies.

Estimates for 1952

Appendix B (page 47) contains estimates of world requirements and exportable surpluses of rice for the year 1952. The figures have been compiled from data readily available with a view to indicating the time that is likely to elapse before the critical shortage is alleviated. It should be emphasized here that, because of the continuing internal unrest in some of the main rice-producing areas, the figures quoted are tentative. The import requirements for most countries are calculated on a flat rate of consumption of 340 grams (12 oz.) per caput of the rice-eating population, after making allowance for local production and for increase in population. An estimated European requirement stated at 1.4 million tons per annum has also been included. For purposes of calculation, it has been assumed that the requirements of the Middle East and Africa will be met by surpluses from Brazil and Egypt. It has also been assumed that very little surplus from the Western Hemisphere countries except Brazil will be exported to Europe and Asia. The figures reveal that world rice requirements in 1952 will be over 10 million tons as against exportable supplies of less than 7 million tons. We infer, therefore, that the gap between supply and demand will be over 3 million tons by 1952.

Distribution of Supplies during Shortage Period

Although all countries are looking forward to the return of free trade, it is recognized that rice will continue to be in acute short supply for a number of years. The Study Group is agreed, therefore, that the continuation of a system of international allocation will be necessary. The principles on which rice allocations are made at present are regarded as satisfactory. These principles, which were set forth at the FAO Special Meeting on Urgent Food Problems in May 1946¹ are as follows:

- (a) the comparative needs of different countries from the nutritional standpoint;

¹ FAO, *Report of the Special Meeting on Urgent Food Problems*, Washington, 6 June 1946, p. 32.

- (b) the levels of prewar consumption in the different claimant countries;
- (c) the need to maintain emergency subsistence levels of consumption in importing countries;
- (d) the extent and duration of undernutrition whether due to circumstances produced by the war, such as occupation or devastation, the effects of drought, or other causes leading to food shortages;
- (e) the extent to which the governments of importing countries are effectively carrying out the policies to secure maximum food production and the efficient procurement and utilization of available supplies for consumption by human beings; and
- (f) the quantities of food available in each country, which should be reported to IEFEC together with information as to the basis on which the figures have been calculated.

Some members have expressed the view that increasing emphasis should be placed on the return to normal trade relations as supply conditions become easier, but others are convinced that the period of acute shortage will last so long that no consideration should now be given to the question of abolishing trade controls. But apart from some form of import and export control by governments concerned, which is implicit in any system of allocation, no other form of control is deemed necessary in the immediate future at least.

Assurances of Long-Term Markets

The problems of assuring long-term markets for rice producers and consumers are closely connected with the stabilization of prices at levels remunerative to growers in the exporting countries and the securing of a more even flow of supplies for consumers in the importing countries. At present the

governments of a number of exporting and importing countries are committed to policies of price regulation and subsidization, designed to maintain rice prices at desired levels. Thus the international market for rice is far from being a "free" market in the traditional sense of the term.

With reference to long-term trade agreements,² our information is that no government in Asia has entered into a long-term contract or agreement covering the disposal of rice. As regards short-term arrangements, there exists a year-to-year agreement between Burma and the United Kingdom whereby all exportable surplus is disposed of through the British Ministry of Food in accordance with the IEFEC allocation. There is also a short-term arrangement under a three-party understanding (United States, United Kingdom, and Siam) whereby the exportable surplus of Siam is distributed according to the IEFEC allocation. Surplus rice from Indo-China is similarly allocated. Some members of the Study Group believe that, because of uncertainty regarding production and trade in the East during the next few years, the subject of long-term markets cannot as yet be usefully considered. Others think, however, that a useful study can be made of the subject now. We are also of the opinion that the general principles enunciated in paragraphs 113 and 114 of the FAO Preparatory Commission's Report on World Food Proposals provide a suitable basis for considering the subject of future long-term contracts for rice.

² The members from Burma, U. K., U. S. A., France, the Netherlands and Australia did not wish to participate in the discussion on trade agreement, trade barriers, tariff, etc., on the ground that many of these matters were being dealt with at the ITO Conference in Geneva, but they offered to furnish any information which might assist other members.

Chapter IX

RESEARCH AND EXTENSION

RESEARCH

IN THE countries represented in the Rice Study Group, research work on rice has been in progress for many years. The funds available to support these research programs have, however, been very limited. As a result, much work still remains to be done before scientific knowledge on the rice crop and of the economic factors involved in its production and utilization is on a par with that available for the other major crops, such as wheat and corn.

The Rice Study Group therefore *recommends*:

- (1) That rice research should be undertaken on an international basis and should include studies on cultural practices, irrigation, drainage, rotation, manuring, and breeding. These studies should be co-ordinated internationally, so that each country can benefit by the results.
- (2) That FAO should establish a system for the exchange of knowledge on selection and hybridization work on rice. By this means, the use of pedigree seeds could be made on a wide scale to considerable economic advantage.
- (3) That any international body given the responsibility to deal with the rice production problems should undertake without delay to disseminate information on the availability of improved seed supplies. It should also collect, maintain, and exchange seeds of new varieties and of old indigenous varieties for purposes of facilitating further improvement in breeding.
- (4) That the research institutions should keep each other constantly advised of new research undertaken, the progress on existing projects, and the results achieved.

EXTENSION SERVICES

Experience of the different countries indicates that generally yields obtained under

field conditions are considerably less than those obtained on the experimental plots. In countries where the extension system is relatively well developed, the yields achieved under field conditions more closely approach those of the experimental stations.

One way by which rice yields per unit area could be increased would be through expanded and modernized programs of adult education for farmers and establishment of rural youth organizations and clubs. Valuable results have been achieved through research; they now need to be translated into the daily practice of the small farmer. This can be done effectively only if governments are prepared to provide properly trained extension staffs of adequate size and the necessary finances required for conducting large-scale, village-wide demonstrations, adapted to local conditions. This is the only known method of adult education that is effective in countries where illiteracy is a mass phenomenon. It is essential that no large-scale demonstrations should be undertaken until the new practice has been extensively tested under the growers' conditions. To achieve abiding results, mass demonstrations must be carried out for at least two or three years in any given region. Continuity of extension work must also be maintained in the areas where the demonstration work has been completed; for this purpose a sufficient staff should be left in the village community to guide and help the farmer.

The information and demonstration work can be fruitfully supplemented by providing essential supplies of improved seeds, fertilizers, and improved implements or machinery to the small subsistence farmer on a subsidy basis. Conditions of development vary from region to region within each country, and it is for the local authority to determine to what extent such assistance is essential in the interest of increased production.

Chapter X

EXCHANGE OF INFORMATION

WE ARE of the opinion that FAO can work expeditiously on rice problems, if it has full access to the various types of information available at governmental or others sources in each country.

The Rice Study Group *recommends*:

That all countries should make arrangements for their publications, reports, and data to be transmitted to FAO immediately upon release. Such materials should include historical information; statistical data; crop and livestock estimates; and publications, periodicals, and technical papers or bulletins relating to rice and to the general agricultural economy. Special consideration should be given to materials that are useful for centralized research and analysis and for the dissemination and exchange of results therefrom to participating countries.

It has been pointed out that the interested experts in some countries have had no opportunity to examine many of the FAO reports. This suggests that FAO should supplement and correct its mailing lists and in some instances should provide governments with a larger number of copies to permit wider distribution. It is also suggested that governments might make arrangements for FAO to transmit some copies of its various publications directly to designated officials both in their metropolitan

and colonial areas. Policy matters would of course be handled through the central governments.

SUPPLEMENT TO THE RICE STUDY GROUP REPORT

The Rice Study Group has had the benefit of a series of working memoranda submitted by the delegates from each participating country and the staff of FAO. In addition, several rice-producing and rice-consuming countries that were unable to send experts to this meeting have submitted notes for consideration. Because of time limitations, the Study Group has been unable to collate and summarize this mass of valuable information for inclusion in its report.

The Rice Study Group *recommends*:

- (1) that FAO should prepare a factual supplement to the Rice Study Group's Report and issue it as soon as practicable, this supplement to be based upon the memoranda and documents submitted to this meeting and the supplementary data referred to in paragraph 2 below; and
- (2) that the delegates from each participating country should endeavor to make the necessary arrangements for assembling the data outlined in Appendix F (page 52) and transmitting it to FAO at an early date.

Appendix A

MEMBERS OF THE RICE STUDY GROUP

AUSTRALIA

Leader: W. H. Prehn, Australian Trade Commission, Bombay, India

BURMA

Leader: B. O. Binns, O. B. E., I. C. S., Financial Commissioner, Government of Burma, Rangoon

Alternate: U. Khin, Deputy Director of Agriculture, Secretariat, Rangoon

Members: U. Ba Tin, Office of the Director of Agriculture, Rangoon
U. Tin, Agricultural Statistician, Department of Agriculture, Rangoon

Secretary: MG. Khin Myat, Financial Commissioner's Office, Secretariat, Rangoon

CHINA

Leader: Siang Yin Ko, Head, Rice Division, National Agriculture Research Bureau, Nanking

Alternate: Hao Jan-Lu, Associate Professor, Agricultural College, National Central University, Nanking

FRANCE

Leader: A. Anziani, Assistant Director of Economic Affairs, Ministry of Overseas Territories, Paris

Members: R. A. Garnier, Manager of the Committee on Cereals, Saigon, Indo-China

G. Huet, Manager of the Rice Office, Saigon, Indo-China

Pham Vam Hai, Rice Owner, Saigon

Rene Grim Provence, Calcutta

Secretary: Isabelle Holmes, Calcutta

INDIA

Leader: Sir S. V. Ramamurti, K.C.I.E., I.C.S., Chief Secretary to the Government of Madras, Madras

Chairman, Rice Study Group: S. Y. Krishnaswami, O.B.E., I.C.S., Joint Secretary, Department of Agriculture, Government of India, New Delhi

Members: Ashutosh Bhattacharyya, Calcutta
K. R. Narayana Aiyar, Commissioner of Civil Supplies, Travancore State, Trivandrum
G. Parameswaran Pillai, Reconstruction Officer, Travancore State, Trivandrum
T. Prasad, Marketing Officer, Central Agricultural Marketing Department, Government of India, New Delhi

B. M. Piplani, Deputy Secretary, Food Department, Government of India, New Delhi

B. Sanjiva Rao, Principal and Professor of Chemistry, Central College, Bangalore

D. R. Sethi, Agricultural Development Commissioner, Department of Agriculture, Government of India, New Delhi

V. S. Tyagaraja Mudaliar, Tiruvarur, Tanjore District, Madras Presidency

B. Viswa Nath, New Delhi

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NETHERLANDS

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Appendix B

FORWARD ESTIMATE OF REQUIREMENTS AND SUPPLY OF RICE FROM SOUTH AND EAST ASIA, 1952

Country	Estimated Rice-eating Population	Present Annual Import Requirements	Assumed Annual Increase in Population	Estimated Import Requirements in 1952	Estimated Surpluses Available in 1952
	millions	million tons	percentage	million tons	million tons
Burma	300.0	2.40	0.9	¹ 1.00	3.3
China					1.6
Siam	250.0	2.40	1.0	3.40	1.3
India					
Indo-China	6.9	0.69	1.0	0.68	
Malaya	1.8	0.21	2.0	0.20	
Hong Kong	0.8	0.05	1.0	0.03	
British North Borneo and Sarawak	70.0	2.00	² 1.5	0.50	
Indonesia	6.8	0.63	1.0	0.67	
Ceylon	13.5	0.28	2.2	³ 0.50	
Philippines					0.5
Korea				2.00	
Japan					⁴ 0.1
Brazil				1.40	
Europe					
Total				10.38	6.8

¹ Estimate furnished by the Chinese members; it is expected, however, that China will be self-supporting if fertilizers and machinery are made available.

² Based on prewar average consumption per caput of 87 kg. of rice yearly.

³ Estimate furnished by the Philippine members; it is expected, however, that the Philippines will be self-sufficient by 1952.

⁴ Excess over exports consigned to the Middle East and East and West Africa.

NOTES: (a) For purposes of calculation, the present and future requirements of areas other than Europe have been based on the assumption of a uniform rate of consumption of 340 grams (12 oz.) of rice per person per day.

(b) The Middle East and South and West African requirements have been offset against Egyptian and Brazilian production.

(c) It is assumed that, excepting Brazil, the rice-producing countries in the Western Hemisphere will have no surpluses for export to the Eastern Hemisphere countries. The estimates of surpluses are, on the whole, regarded as conservative.

Appendix C

TABLE OF WEIGHTS AND MEASURES FOR RICE (With Conversion Factors)

U. S.:BRITISH MEASURES—METRIC EQUIVALENTS			
<i>Area</i>	1 acre	0.4047 hectare	1 hectare .....2.4711 acres
<i>Capacity</i>	1 imp. gal.	4.5460 liters	1 liter .....0.2200 imp. gal.
	1 U. S. gal.	3.785 liters	
	1 imp. bushel	36.37 liters	
	1 U. S. bushel	35.24 liters	
	1 U. S. gal.	0.8327 imp. gal.	
<i>Weight</i>	1 ounce	28.36 grams	1 gram .....0.0353 ounce
	1 pound	0.4536 kilograms	1 kilogram .....2.2046 pounds
	1 imp. cwt.	0.5080 quintal	1 quintal .....1.9685 imp. cwt.
	1 long ton	1.016 metric tons	
	1 short ton	0.9072 metric ton	
	1 imp. cwt.	112 pounds	
	1 long ton	2240 pounds	
	1 short ton	2000 pounds	

NATIVE UNIT AND USE; RICE CONVERSIONS	U. S.:BRITISH EQUIVALENT	METRIC EQUIVALENT
Burma		
<i>Area:</i> Same as British for official statistics.		
<i>Capacity</i> (Standard measure)		
1 nozibu	19.3 cu. in.	0.145 liter
1 pyi	8 nozibus	1.160 liters
1 basket (9 imp. gals.)	128 nozibus	40.6 liters
Native baskets vary from 120 to 150 nozibus		
<i>Weight</i>		
Standard basket contains 46 lbs. paddy; other equivalents are as follows:		
1 basket rice bran or meal	45 pounds	20 kilograms
1 basket rough broken rice	68 pounds	31 kilograms
1 basket broken rice	72 pounds	33 kilograms
1 basket white rice	75 pounds	34 kilograms

Ceylon

The British system is official for Ceylon; the long ton and imperial hundredweight (112 lbs.) are used in foreign trade returns.

China

The principal units of the new market, or "Shih" system, are as follows:

<i>Area</i>	1 Shih mou	0.165 acre	6 2/3 ares
	1 Shih ch'ing	16.47 acres	6 2/3 hectares
	1 Shih sheng	0.2642 U. S. gals.	1 liter
	1 Shih tou	2.642 U. S. gals.	10 liters
	1 Shih shih	26.42 U. S. gals.	1 hectoliter
<i>Weight</i>	1 Shih liang	0.6889 pounds	0.3125 kilograms
	1 Shih chin (catty)	1.102 pounds	0.5000 kilograms
	1 Shih tan (picul)	110.2 pounds	50.000 kilograms

The tan (picul) of 0.60779 quintals (133.99 lbs.) refers to the old Chinese Standard (prior to the adoption of the new market standard), and the picul of 0.60453 quintals (133.27 lbs.) is sometimes used in commerce with Europe. Both in Hong Kong and Manchuria the picul of 0.6048 quintals (133 1/3 lbs.) is used.

NATIVE UNIT AND USE; RICE CONVERSIONS	U. S.:BRITISH EQUIVALENT	METRIC EQUIVALENT
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India

The British system is the only complete system in use; it appears in official statistical summaries and in foreign trade returns.

Area: Same as British for official statistics. Local units are extremely diversified.

Weight (Standard domestic)	1 tola	180 grains	0.4114 ounce	11.66 grams
	1 chhatank	5 tolas	0.1286 pound	0.0583 kilogram
	1 seer	80 tolas	2.057 pounds	0.9931 kilogram
	1 maund *	40 seers	82.2857 pounds	37.3247 kilograms
	1 bag, though locally variable, is approximately		168 pounds	76.4 kilograms

* Also called Railway, Bengal, or Imperial maund.

Indo-China

The metric system is used officially in Indo-China. The following local measures are also used:

Area	1 sao (Annam)	0.089 acre	3.60 ares
	1 mau 10 sao (Annam)	0.890 acre	0.360 hectare
	1 mau (Tonkin)	1.2 acres	0.50 hectare
Capacity	1 gia (Cochin China and Cambodia)	10.57 U. S. gals.	40.0 liters
Weight	1 yen (Cochin China and Cambodia)	13.327 pounds	6.0450 kilograms

According to the trade practices at Saigon the following weights are also used:

1 picul paddy	149.9 pounds	0.6800 quintal
1 picul rice	141.1 pounds	0.6400 quintal

100 kilograms of paddy yield the following processed rice:

Choice grade (15% broken rice)	44 kilograms
Choice grade (20% broken rice)	49 kilograms
No. 1 grade (25% broken rice)	51 kilograms
No. 2 grade (40% broken rice)	63 kilograms
Cargo grade	73 kilograms

Indonesia

In addition to the metric system, the following weights and measures are used:

Area	1 bahoe (bouw)	1.7536 acres	0.7097 hectare
	1 Rijnlandsche morgen	2.1043 acres	0.8516 hectare
	1 Djo-eng...2 bahoe (West Java)	3.5072 acres	1.4193 hectares
	1 Pantjar...4 bahoe (East Java)	7.0144 acres	2.8386 hectares
Capacity	1 batok (for rice)	0.2823 U. S. gal.	1.0721 liters
	1 gantang...4 batok (East Java)	1.1323 U. S. gals.	4.2884 liters
	1 gantang...8 batok (Central Java)	2.2656 U. S. gals.	8.5768 liters
Weight	1 kati	1.3616 pounds	0.6176 kilogram
	1 picul...100 katis	136.16 pounds	61.76 kilograms
	1 Koyan...27 piculs (rice, Batavia)	1.8381 short tons	1.6676 metric tons
	1 Koyan...28 piculs... (rice, Samarang)	1.9062 short tons	1.7293 metric tons
	1 Koyan...30 piculs (rice, Soerabaja)	2.0424 short tons	1.8528 metric tons

In East Java, 1 gantang (4 batoks) of rice weighs 3.0881 kilograms (6.808 pounds); in central Java, 1 gantang (or 8 batoks) rice weighs 6.1761 kilograms (13.616 pounds); 1 hectoliter decorticated rice weighs 80.8 kilograms (178.1 pounds); 1 hectoliter rough rice weighs 56 kilograms (123.5 pounds).

Japan

The metric system was adopted in 1909. The following native measures still prevail:

Area	1 tan	0.245 acre	9.9174 ares
	1 cho—10 tans	2.45 acres	0.9917 hectare
Capacity	1 to	4.766 U. S. gals.	18.039 liters
	1 koku—10 to	47.659 U. S. gals.	1.8039 hectoliters
Weight	1 kin	1.32 pounds	0.60 kilograms
	1 kwan—6.25 kin	8.28 pounds	3.75 kilograms
	1 picul...100 kin	132.00 pounds	0.60 quintal

Japanese "rough" rice (called also "genmai" or brown rice) is not paddy but dehusked rice without the bran layer removed. Weights per koku (5.119 bushels) of various kinds of rice are as follows:

1 koku paddy	223.2 pounds	1.0125 quintals
1 koku brown rice	330.7 pounds	1.5000 quintals
1 koku white rice	314.2 pounds	1.4250 quintals

100 kilograms of paddy yield on the average 80.4 kilograms brown rice or 73.7 kilograms of white rice.

NATIVE UNIT AND USE; RICE CONVERSIONS		U. S.:BRITISH EQUIVALENT	METRIC EQUIVALENT
Korea			
Uses the same units of weight and measures of capacity as Japan; the unit of area, the "chungbo", is 0.9699 hectares rather than the "cho" of 0.9917 hectares.			
<i>Area</i>	1 chungbo	2.451 acres	0.9699 hectares
<i>Capacity</i>	1 suk	5.119 bushels	
The weights per suk of various quantities of rice are as follows:			
	1 suk paddy	224.87 pounds	1.02 quintals
	1 suk brown rice	310.85 pounds	1.41 quintals
	1 suk white and broken rice	317.46 pounds	1.44 quintals
100 kilograms of paddy yield 76 kilograms of brown rice or 72.96 kilograms of milled rice.			
Malaya			
Other than English system of weights and measures, the following local measures are used:			
<i>Capacity</i>	1 gantang—5 imperial gallon	1.2010 U. S. gals. ..	4.5460 liters
	1 para....10 gantangs	12.0104 U. S. gals. ..	0.4546 hectoliter
	1 koyan....800 gantangs	960.83 U. S. gals.	36.3677 hectoliters
<i>Weight</i>	1 kati	1.3333 pounds	0.6048 kilograms
	1 picul....100 katis	133.333 pounds	0.6048 quintal
	1 bhara....3 piculs	400 pounds	1.8144 quintals
	1 koyan....40 piculs	5,333.33 pounds	24.192 quintals
100 kilograms of paddy yield on the average 62 kilograms of cleaned rice.			
Philippine Republic			
In addition to the metric system, the following local weights and measures are also prevalent:			
<i>Area</i>	1 balita	0.6906 acre	0.2795 hectare
	1 quignong....10 balitas	6.9067 acres	2.7950 hectares
<i>Capacity</i>	1 ganta	0.7926 U. S. gal.	3 liters
	1 cavan....25 gantas	19.82 U. S. gals.	75 liters
<i>Weight</i>	1 catty	1.394 pounds	0.6325 kilogram
	1 picul....100 catties	139.44 pounds	0.6325 quintal
	1 quintal espanol	101 pounds	0.46 quintal
1 cavan cleaned rice weighs 56 kilograms; 1 cavan "palay" (rough rice) weighs 44 kilograms, yields 28 kilograms cleaned rice.			
Siam			
The following is the present official system of weights and measures in Siam:			
<i>Area</i>	1 rai	0.395 acre	0.1600 hectare
<i>Capacity</i>	1 tung	5.28 U. S. gals.	20 liters
	1 kwien....100 tung	528.4 U. S. gals.	20 hectoliters
<i>Weight</i>	1 picul	132.28 pounds	0.600 quintal
The following are weights per kwien of various grades of rice:			
	1 kwien paddy about	1.053 long tons	10.50 quintals
	1 kwien cargo rice about	1.398 long tons	14.20 quintals
	1 kwien white rice about	1.476 long tons	15.00 quintals
100 kilograms paddy yield on the average about 66 kilograms cleaned rice.			

Appendix D

INTERNATIONAL RESERVE STOCKS

Note by a Subcommittee of the Rice Study Group

The discussion of international reserve stocks of rice by the Study Group follows the recommendation made by the FAO Preparatory Commission on World Food Proposals at Washington in October 1946. The Commission recommended the creation of famine reserves by the importing countries as soon as the supply position permits and of price stabilization reserves for the exporting countries. The fundamental assumption in this discussion is that international agreement will be reached among the chief rice-producing and rice-consuming countries in respect to floor and ceiling prices and that government control of distribution will continue.

The main questions for examination are the size of the reserves, their location, the methods of organization and finance, and the rules under which they will be operated.

1. Size of Reserves

(a) Among the deficit countries, China and India together represent 80 percent of the total production. For India the reserve required has been estimated by an expert committee at 1 million tons. For China the figure of 2 million has been given. To this total must be added approximately 1/15 more to cover the famine reserve requirements of countries such as Malaya, Ceylon, and the Philippines. Excluding Japan, therefore, the minimum reserve required to ensure the chief rice-importing countries against risk of famine is about 3.25 million tons.

(b) Against this, what should be the normal size of the price stabilization reserve to safeguard the chief exporting countries against price fluctuations? The only logical method is to examine in the case of Burma, Siam, and Indo-China, the difference between the maximum exports in any of the prewar years and the average exports. For this purpose, figures for the period 1931-41 have been examined. The results are 530,000 tons for Burma, 300,000 tons for Siam, and 140,000 tons for Indo-China. Thus, to stabilize prices it will be necessary for these respective governments to absorb from the market the maximum quantities mentioned above. A total reserve of 970,000 tons may be visualized.

2. Location

As reserves will be nationally held, their location will be for individual governments to decide. In the case of importing countries, considerations of price regulation and of supplies will require suitable dispersal of reserves at ports, in procurement areas, and in deficit zones. In the case of exporting countries, reserves will have to be located at ports of shipment and in assembly centers in important producing districts. Centers of location will, therefore, have to be carefully selected in each case after taking into account all the relevant considerations.

3. Organization and Finance

The form of organization under which reserve stocks will be operated will again have to be determined by each country with reference to its in-

ternal conditions. Some countries might like to set up for this purpose a commercial corporation under private ownership but working under State control. Others might, as has been suggested in the case of India, like to combine commercial efficiency with interests of government policy and create a statutory corporation under State ownership and management.

Considerable capital and recurring costs will, of course, be involved in the maintenance of reserve stocks. Fixed capital will be needed for constructing the necessary storage facilities, and working capital will be required for purchasing stocks. Operating expenses will be in respect of depreciation and maintenance of godowns or warehouses, deterioration of stocks, agency commission, and establishment charges. So far as capital costs are concerned, provision has been made in the FAO recommendation that those countries which are unable to raise necessary funds without affecting their economic and financial structure may request financial assistance from the World Bank. Nevertheless, there seems to be a great deal of misunderstanding about the financial aspects of the maintenance of reserve stocks. The annual operating costs estimated for the proposed reserve in India will not exceed 0.25 percent of the value of the annual food-grain production. On a similar basis, Burma's prewar annual rice production may be valued at about £100 million. The annual operating costs for a price stabilization reserve of a little over 500,000 tons of rice should not exceed £300,000. Nor would this amount be a dead loss as, over a number of years, such schemes for reserves may be expected to become commercially self-supporting. The costs involved are extremely small when it is realized that the arrangements proposed will bring stability to rice production and distribution and thus to the national economies of Burma, Siam, and Indo-China and lead to the happiness of millions of homes in South and East Asia.

4. Rules of Operation

What rules are necessary to integrate the above-mentioned reserve stocks into a co-ordinated scheme of international reserves? Some of the problems on which agreement of the major producing and consuming countries will be necessary are, for example, as follows:

(a) At what stage will a surplus country be willing to let a deficit country buy in its markets for purposes of reserves? (The answer perhaps is: when the surplus country has completed its own purchases for reserves.)

(b) Can any part of the price stabilization reserve of an exporting country be used, under agreed conditions, for mitigating shortages in deficit countries in certain years? (This question has been answered in the affirmative by the FAO Preparatory Commission.

(c) How can a system of international reserves, such as is visualized above, be fitted into an international rice agreement if such an agreement is found necessary for implementing a policy of stabilizing rice prices in important producing and consuming countries?

Appendix E

A NOTE ON ASSURANCE OF LONG-TERM MARKETS

The subject of providing assurances of long-term market prospects to producers and consumers is in some degree connected with the system of price stability discussed by the Rice Study Group. While some members felt that owing to uncertainty regarding production and trade during the next few years, the subject could not be usefully considered except in a general manner; other delegates thought that a useful study could be made of the subject after making some assumptions.

For discussing assurances to producing countries, certain fundamental assumptions must be made; otherwise, owing to the present shortages, the discussion will tend to be unreal. The first assumption is that, while there is no likelihood of any surpluses arising in the immediate future, the possibility of such a state of affairs in the not-too-distant future cannot be ruled out. The second assumption is in regard to the system of trading, with reference to controls. It may be that by the time the surpluses arise, international distribution of rice from the exporting areas may have already been passed on to private trade. The same assumption cannot, however, be made with regard to decontrol in importing countries because of the real danger of shortage and the necessity of building up famine reserves. In other words, it must be taken for granted for the purpose of this discussion that the position with regard to the control of rice trade will vary from one country to another.

Under these assumptions, what then are the long-term assurances regarding market prospects that can be thought of for the benefit of the producing

countries? It has already been pointed out that, as a measure of price stability, certain price stabilization reserves, nationally held but internationally controlled, would be desirable. In the event, therefore, of surpluses arising in exporting countries, the first measure that would come into operation would be the absorption of stocks from the market up to the maximum visualized under the price stabilization reserves. If this measure should not be sufficient by itself, the second line of support would be the famine reserves of the importing countries for which purchases would next begin. Both these operations will have the effect of steadying the market and it may be assumed that with their operation burdensome surpluses over any particular year will be corrected. Also, it has been recognized that, as in the prewar years, there may again arise a situation when, on the one hand, surplus stocks cannot be profitably disposed of and, on the other, millions of people are underfed because of want of purchasing power. It should be possible, under agreed international rules, to set the machinery of special price sales in motion to bring these two opposite propositions together.

With regard to assurances to the consuming countries for avoiding shortages, if the plans for price stabilization and famine reserves previously visualized work successfully, there is no reason why the consuming countries should at any time be subjected to shortage in supplies as such conditions of stability will have been provided for rice production as should ensure continuity and sufficiency of supplies.

Appendix F

SUPPLEMENTARY INFORMATION

The Rice Study Group recommended that each country transmit to FAO in Washington during August 1947 the selected items of factual information needed in the preparation of the proposed supplement to this report. The types of information asked by the group were:

1. Area planted to rice, 1926-1946 (*Unit—hectare*)

This table should contain information by provincial areas. It should also list the irrigated field separately from the upland field. If official data are not available, the most reliable estimates should be furnished.

2. Yield of rice, 1926-1946 (*Unit—metric tons per hectare*)

The yield should be given in terms of paddy instead of stalk paddy. As in item 1 above, information should be given by provincial areas and for irrigated and upland field.

3. Production of rice, 1926-1946 (*Unit—metric tons of paddy*)

Detailed information corresponding to items 1 and 2 above should be furnished.

4. Domestic trade of rice, 1926-1946 (*Unit—metric tons of milled rice*)

This table should show the interprovincial movement of rice. If paddy rice is shipped from one province to another, it should be converted into and expressed in terms of milled rice.

5. Foreign trade in rice, 1926-1946 (*Unit—metric tons of milled rice*)

This table should contain information by countries to which and from which the rice was shipped. It should list gross imports, re-exports, and gross exports. A column showing the net imports or exports is desirable.

6. Prices of rice, 1926-1946 (*Monthly average prices per metric ton*)

This table should have three sections: (1) farm prices in terms of paddy; (2) transit market prices in terms of milled rice; and (3) terminal market prices in terms of milled rice. Prices of common grade rice

should be used. The exchange value of local currency with the U. S. dollar, preferably T. T. quotation of New York, for the respective periods, should be given for reference.

7. Cost of transportation of rice (*Unit—local currency per metric ton*)

Any one specific prewar year and one post-war year should be used as bases. Costs of transporting paddy and rice should be given in terms of one metric ton per kilometer, and the mode of transportation—by labor, cart, ship, rail, or any customary means—should be indicated.

8. Rice prices and general commodity prices index, 1926-1946

The 1926 wholesale prices at terminal markets should be used as the base.

9. Rice stock position, 1926-1946 (*Unit — metric tons of milled rice*)

Details should be given by provincial areas and by seasons. If these details are not available, the annual carry-over stock at the end of the crop year may be used.

10. Uses of rice, for three selected years, such as 1931, 1941, and 1946 (*Unit—metric tons of paddy*)

Information should be based on annual total disappearance of rice. Details should be given on:

a. Nonfood uses

- (1) Seed, with footnote on seeding rate, in kilograms per hectare
- (2) Feed uses
- (3) Industrial uses, including alcoholic beverages, starch manufacturing, and other processings

b. Wastes

- (1) Milling loss, with footnote on percentage of extraction and hulling
- (2) Storage loss
- (3) Transportation loss
- (4) Other wastes

11. Conversion factors of rice

All official conversion factors of weights and measures, volume, and area should be given, and conversion factors from paddy to hulled and to milled rice, both by volume and by weight.

12. Sowing, transplanting, and harvesting periods of principal varieties of rice

Details should be given by provincial areas.

Appendix G

STATEMENTS BY DELEGATIONS

STATEMENT BY THE BURMESE DELEGATION

Burma is opposed to the multiplication of international organizations except in case of proved *present* necessity. We are not, therefore, prepared to consider the establishment of an international organization for rice to meet future eventualities but only to meet present necessities. The deliberations of the Study Group insofar as they have come to our notice have disclosed present necessity in the following cases only:

- (1) allocation of rice during the period of short supply;
- (2) collection, collation, and dissemination of statistical and technical information;
- (3) the need to keep a constant watch on a continually, and potentially rapidly, changing and developing situation in the rice trade.

Burma desires to emphasize that these are world problems and must be dealt with on a "world scale". We must again point out that we are world traders in rice and not merely Asiatic traders and that, though it is true that the bulk of our exports go to Asiatic countries, an important proportion of our trade has always been with countries outside Asia. We wish not only to restore and maintain but also to develop this extra-Asiatic trade, and we must, therefore, insist that rice be regarded as a world commodity and that any organization concerned with rice be a world organization and not a re-

gional one, though we do not, of course, rule out the possibility of regional branches of the world organization.

We also wish to record that we are approaching the conclusion that, apart from the possibility of increasing production by increased area or by elaborate and costly development schemes, the great hope of increased production lies outside traditional Burmese methods of cultivation, that is to say in modernization of our methods of rice production. For this reason we are anxious to be brought into touch with and to remain in touch with those countries in Europe, America, and Australasia that have applied modern techniques to rice production. For this reason also we must insist that any study of rice be a world study and not merely a regional study.

We are also extremely doubtful of the wisdom of giving undefined executive authority to anybody and must therefore oppose the grant of executive authority to any international rice organization except on the clearest proof of necessity.

With these preliminary remarks we approach the present problems.

The necessity of allocating the limited supplies of rice at present available is admitted. The organization for this allocation exists in the International Emergency Food Council, and we are convinced that this organization should continue in its present or a very similar form. The allocation of supplies has little to do with the other problems of rice. In the first place, it may be, we hope, temporary whereas the others are permanent. In the second place, it is

intimately connected with the allocation of other foodstuffs in short supply, especially wheat. We regard it as essential that the allocation of all foodstuffs in short supply should be in the hands of a single international organization, and we therefore recommend that allocations should remain with the International Emergency Food Council or its successor.

The other two cases demand an entirely different organization and we are satisfied that this organization should be the Food and Agriculture Organization as they obviously come under Article I of FAO's Constitution.

We, therefore, recommend that, if it has not already been done, a special rice section of FAO be constituted with a suitable secretariat to co-ordinate all work done by FAO in connection with rice, to ensure the dissemination of information, to call the attention of member nations to the problems which arise from time to time, and to convene technical and other conferences. To this FAO rice section should be attached a permanent study group or committee representing all the important producing and consuming countries. The duty of this group will be to conduct a continuous study of the problems of rice production, processing, and distribution and it should have the right to co-opt specialist members for the study of a particular subject.

We hold no strong views on the seat of this study group, provided that it is open to all producers for export and all important consumers whether in Asia, Europe, America or elsewhere. Its natural seat would be at the headquarters of FAO but if Regional Offices of FAO are opened the seat of the study group might reasonably be the headquarters of a Regional Office for South and East Asia which should be centrally situated in the rice-producing region. We wish, however, to make it clear that wherever situated the study group should be a world body and not a regional body and it must certainly be situated where it will be in touch with FAO or one of its Regional Offices.

STATEMENT BY THE LEADER OF THE INDIAN DELEGATION

The memorandum of the Chairman on the subject of an international organization to deal specially with rice has given the pros and cons in regard to such a proposal. The proposal to form a rice board in Southeast Asia was made by me as the alternate leader of the Indian Delegation to the FAO Preparatory Commission at Washington, and it was on the basis of this proposal that it was agreed that the Rice Study Group should prepare the agenda and material for an international rice conference. Only a few of us here were present during the discussion in the working party presided over by Viscount Bruce. I had to point out there that the reasons why we ask for a rice board to be located in Southeast Asia are: that 80 percent of the production and consumption of rice is in that area; that measures designed to increase production should be discussed and decided on in the area itself; that the men and materials necessary for the investigation into rice problems would be most easily available on the spot; that the needs in regard to rice are most keenly felt by the people in the area; that the economic conditions of the producing countries are similar, and also those of the consuming countries; that the transportation in the area could be easily

arranged; and that the currency problems of interchange of rice between the countries in Southeast Asia could be simply solved. On the other hand, I pointed out, the administration of rice now lies in the hands of a body situated at Washington and dominated by countries that are little concerned with rice and are little competent to deal with it as compared with countries in Southeast Asia that live and move in rice. Lord Bruce, however, pointed out that FAO could not form a Rice Board, but what FAO could do was to form a Working Party or Study Group to gather the facts and prepare an agenda for a conference of nations producing and consuming rice, those nations would be the ones competent to form a Rice Board such as I proposed.

The Rice Study Group that has been formed by FAO as a result of the recommendation of the FAO Preparatory Commission consists of 9 nations of which 4 come from Europe and America, which produce about 5 percent of the world's rice, while the remaining five come from Asia, which produces and consumes 95 percent of the rice. It is clear that there has been a somewhat unbalanced representation in the Rice Study Group because when a large change in the mechanism of the rice control is needed, an overdue representation has been given to nations whose interest is comparatively small. However, I am quite conscious of the fact that during the last century Europe and America have been dominant in the world, and methods of organization and of scientific research have been developed by them which will be of use to Asia in the coming years. Asia, however, cannot agree to a continuance of the domination in its domestic affairs by countries in Europe and America. During the discussion in the three committees, subjects such as the physics, chemistry, biology and economics of food production have been competently discussed by technical experts. Reading the results of the discussion, after having been away from Trivandrum all these days, I find, however, that there is one subject which has not been dealt with and that is the psychological aspect of the situation. European countries are quitting their erstwhile empires in Asia. Asia is no longer content to have its domestic affairs managed either from London or from Washington. Rice is the one agricultural commodity that is pre-eminently the domestic concern of Asia, and particularly of Southeast Asia. It is a matter of self-respect for us that it shall no longer be controlled from Washington. This is an aspect which, I fear, half the Study Group cannot, or has failed to, appreciate. Otherwise I am unable to understand the lack of friendly co-operation, particularly from the United States and the United Kingdom that has been shown towards the Indian proposal. For this reason alone, if for no other, India and other Asiatic countries such as those represented at the Asian Relations Conference recently held at Delhi, cannot agree to a continuance of control of rice administration from Washington. I placed before the Asian Relations Conference the proposal for the formation of a rice board in Southeast Asia and it was widely welcomed and supported. The voice of India at Trivandrum was also the voice at Delhi. If rice were discussed at a conference of Asian countries speaking through their own nationals as representatives of popular governments, I feel confident that India would not be outvoted as has happened on this question in a committee of this group.

There was even considerable opinion at the Asian

Conference in favor of forming a Food and Agriculture Organization for Asia. India has long believed in "One World". It is a matter of philosophic and religious faith for her. It was for this reason that at the meeting of the FAO Preparatory Commission in Washington, India more than any other nation stood out for a World Food Council, but India does not look on One World as a thing to be presented on a platter and to be gobbled at one gulp by any dominant nation. The One World that India thinks of is a world where all its members have fair play and justice and freedom to look after their own special interests with the assistance and co-operation of all. India does not seek to be a big power. The role of India is that of a big brother helping smaller brothers to the extent that they need help. India's subscription to the One World doctrine, therefore, means not only the attainment of the One World but also the autonomy of its parts. Asia is practically the whole of the rice world. Rice administration must, therefore, be transferred from London and Washington to where it naturally belongs.

Even looking at it from the practical point of view, India has felt that it has not received a fair deal from the Combined Food Board and its successor, the present International Emergency Food Council. I was a member of a Food Mission which went to London and Washington early last year to seek food at a time when India was faced by a crisis. At that time India was not a member of the Combined Food Board, though little Cuba was. India was not even a member of the Rice Committee or Wheat Committee of the Combined Food Board, and we were just tolerated as observers sitting round the wall, while men who had more power than we in regard to the food that we needed from our own neighbors made decisions. The mechanism of their allocation was that the protégés of dominant powers like the United States of America and the United Kingdom were first allotted quotas, and the dregs that were left were given to India and China. The Chinese delegate who was the only Asiatic on the Combined Food Board drew pointed attention to this and objected to it. It was then that I determined that such an unjust method of dealing with Asiatic production for Asiatic consumption must not continue and hence it was that I made the proposal for a rice board in Southeast Asia when I attended the Washington conference of the FAO Commission. Even now, there have been complaints, judging from the newspapers, of the IEFEC being unfair to the weaker nations and of the United States and the United Kingdom acting on political considerations of their own in regard to food allocations by the IEFEC. In the IEFEC there are many nations who have nothing to do with rice and yet they allocate rice which is half the food of the world. Nations like Canada who are in the IEFEC swell the voting power of the United Kingdom even in regard to rice. Rice relates to a concentrated area of the world and it must be dealt with by the people of that region. Theirs is the need, theirs is the right, and theirs is the responsibility.

There is also another reason why we want to have a rice board in Southeast Asia. There is no other cereal, or even any other basic food, all the aspects of which can be dealt with so conveniently by one body as rice. The conditions of wheat production all over the world are varied. The conditions of rice production in Southeast Asia are very much alike. In Southeast Asia too, while there

are big countries like India and China which can afford to be members of a far-off international body at Washington, there are small countries like Burma, Malaya, Ceylon, Indo-China and Indonesia, that can hardly find either the men or the money needed for their people to be represented at an international gathering on the other side of the world. At present the IEFEC has on it the representatives only of the people of India and China.* It is the right of all the major rice-producing and -consuming peoples of Asia—that is to say, of all the people of Southeast Asia—to have a voice in the allocation of rice. They cannot afford to be members of the IEFEC which deals with allocation of rice, but they can certainly claim to have as much right as any other nation that deals with rice. Then, again, Asia is economically a depressed continent. Its wealth comes, in the main, from agriculture. And agriculture, in the main, is the culture of rice. Production of rice in Asia is generally at a low level. There is no reason why the rate of production should not be doubled. If this is done, the economic strength of Asia itself will be doubled. It is not to the interest of countries other than those of Asia to pay the wholehearted attention that is necessary to increase the production of rice in Asia.

There have been several recommendations from the committees of this Group making suggestions for action by FAO itself. But it must be remembered that FAO has no organization in Southeast Asia. The Director-General is prepared to have work done for India and China when he finds specially competent men to be advisers for India and China. Even then, there is no anticipation of work being specially done for other parts of Asia. FAO is just growing. It has enough work to do in America and Europe. To saddle it with special work to do in connection with rice is to ask for what is not feasible. If rice work is to be attended to with special care and attention in Southeast Asia, it must be done by a special body, no doubt under the auspices of FAO and in co-ordination with other commodity councils but with an existence of its own.

I have given some of the background for my proposal to form a rice board in Southeast Asia. The matter is not one that can be decided on in the Study Group. This Study Group is only a fact-finding body. The material that it produces is to be placed before a conference of the nations that, in the main, produce and consume rice, so that they may decide as to how the future organization of rice administration shall be settled. One thing, however, that the working of the Study Group shows is that this is a problem which must be dealt with by the people most vitally concerned. The United Kingdom has been wise in agreeing to quit control over India. I trust that she will be wise again and agree to quit control over rice. The United States has demanded and obtained freedom for American affairs from non-American interference. India too demands freedom for Asiatic affairs from non-Asiatic interference. To concede that demand gracefully in regard to rice is necessary for the continued and successful functioning of FAO in which we are all interested.

STATEMENT BY THE CHINESE DELEGATION

The Chinese Delegation agrees in principle that, as long as the present acute shortages of rice exist,

* EDITOR'S NOTE: The Philippine Republic and Siam are members.

there should be an international organization to allocate the exportable surplus among the deficit countries on the basis of needs. This organization should be formed as a part of FAO and under the direction of FAO. It should not in the least weaken the function of FAO. Moreover, the Chinese Delegation suggests that an FAO Regional Office be set up in South and East Asia in order to perform its functions efficiently through close contact with the rice-producing and -consuming countries alike. This organization should be based on the principle that each country represented should have the same rights.

The relation between FAO and the proposed international organization should be the same as the relation between a central government and a provincial government.

With the concurrence of FAO the proposed international organization should execute the decisions made with reference to allocation and distribution of rice and research and study of the problems connected with rice. To this international organization, a permanent Rice Study Group should be attached.

The proposed international organization should be established in a suitable place in South and East Asia. The constitution, function, and location of the purposed international organization should be decided at the world-wide rice conference which should be called as soon as possible.

STATEMENT BY THE PHILIPPINE REPUBLIC

We agree with the Burmese Delegation that the proposed rice body should be a world organization, but we wish to add that, since 95 percent of the world's rice is produced and consumed in South and East Asia, we agree with the Indian Delegation that the seat of such an organization should be located within this region to avoid administration by remote control, provided, however, that, if found necessary, branches of such an organization may be established in any other region where rice is also grown.

Since such an organization will be under FAO it naturally cannot have functions and prerogatives that FAO does not have; but we agree with the Indian Delegation that to make such an organization effective it should not be subordinated to any other FAO unit, and that with regard to rice it should have all the powers now vested in FAO as well as others which FAO may be given in the future.

This view of the Philippine Delegation should not be construed as a sign of dissatisfaction with the work of FAO as organized. On the contrary, we commend this body, but we believe that a separate international rice organization is timely and necessary to make this work still more effective. We suggest that this proposal should be the subject of an international conference, the member governments of which should carefully consider in detail what functions an international rice organization should have, how it would be financed and when and where it should be organized.

STATEMENT BY THE SIAMESE DELEGATION

Before leaving for the Trivandrum Conference, the Siamese Delegation did not have an opportunity of studying the proposal on the subject, as contained in the Report of the FAO Preparatory Commission, because the said Report had not reached the Dele-

gation designate. The Delegation has had, therefore, no opportunity of ascertaining the views of its government on the matter. In joining in the discussion at the conference, the Delegation has done so from the point of view of making itself as useful as possible to the Rice Study Group; any conclusion it has reached as a result of the deliberations is entirely unofficial, having no binding effect upon the Government. It is the wish of the Delegation that this subject be finally discussed and decided upon at the FAO Conference at Geneva in August 1947 to which it is expected that the government will send representatives with full powers.

The Siamese Delegation understands that it is the question of time that precludes the possibility of calling an international conference in accordance with the recommendation of the FAO Preparatory Commission. Since the report of this Study group will be considered at the FAO Conference in August, this Delegation thinks that the whole question of international conference or international organization as envisaged in this Study Group should be discussed and settled there among the representatives of the various governments.

STATEMENT BY THE NETHERLANDS DELEGATION

The views of the Netherlands Delegation regarding steps that should be taken on the international level for the improvement of the rice economy are clearly defined in a working paper of the meeting, part of which is quoted here.

"We are of the opinion that the functions of FAO regarding rice could be executed in the best way, if a special secretariat on rice were established to co-ordinate the work done on rice in the different sections of the FAO headquarters.

"It may further be stressed that although 90 percent of the world's rice is produced and consumed in South and East Asia, the rice problem is of a world-wide character, not only because some countries in the Western Hemisphere have an important interest in the production and consumption of rice but also because there is an inter-relationship between rice and other cereals.

"Any international steps that might be taken should, therefore, be on a world-wide basis, and all the major rice-producing and -consuming countries of the world should have the opportunity to take part in any proposed actions wherever their interests are involved.

"However, we believe that FAO headquarters in Washington are too far away from the great centers of rice production and consumption to enable the central staff to cope with many phases of the work required. Much work in the field has to be done in South and East Asia. Many meetings of experts will have to take place and it would be of great help if the programs of FAO, especially with regard to rice, could be decentralized in such a way that more and better attention could be concentrated on all matters concerned with rice.

"The establishment of a regional office of FAO would be an important step in this direction. Such an office would most probably be divided into the same divisions as the Head Office; so it would have divisions of Agriculture, Nutrition, Economics, Marketing, and Statistics, Forestry and Forest Products, Fisheries, etc.

"Whereas the care for the rice problem would be one of the main tasks of a regional office of FAO in

South and East Asia, it seems desirable that this office, like FAO headquarters, be equipped with a special secretariat for rice, whose task would be to co-ordinate and stimulate the work done in the different sections of the regional office, and further to collect and disseminate all information regarding rice, and to take the initiative in calling special conferences of experts.

"This secretariat should promote and co-ordinate the work done by FAO on rice, and, in addition, should keep in constant contact with the countries concerned. This constant contact could be best maintained if a permanent rice study group consisting of members of all major rice-producing and -consuming countries were formed.

"This permanent group would have the task of conducting continuous study of the problems of rice production, processing, marketing, and consumption. The rice secretariat of the FAO regional office would be the secretariat of the study group. The group should meet regularly; the meeting place might not always be the same, but, according to a schedule, the meetings might take place in different co-operating countries.

"Continuous study and exchange of ideas may lead the study group to make recommendations for common action, for which purpose intergovernmental agreements would have to come into existence. With regard to price stabilization and stockholding it should be noted that we believe that national policies in these fields cannot be adopted at present by the several countries due to a variety of different national problems. For this reason, and taking into account that rice is in such short supply at the present moment, intergovernmental action with regard to prices and stockholding does not seem feasible for the time being.

"In the future, however, when more normal conditions have been established, the desirability and even the necessity of intergovernmental action on the above-mentioned subjects may become evident. The study group should be prepared to make the necessary recommendations through FAO to the different countries, whenever circumstances so require.

"We therefore recommend:

- (a) that FAO headquarters should be equipped with a special secretariat for rice whose task should be the co-ordination of the work on rice done in the different sections of FAO headquarters and in the proposed regional office in South and East Asia;
- (b) that a regional office of FAO should be constituted somewhere in South and East Asia as early as possible;
- (c) that this regional office should be equipped with a secretariat for rice, whose task should be co-ordinating and promoting the work on rice done by the regional office, keeping constant contact with the countries concerned and collecting and disseminating all available information on rice; and
- (d) that a permanent rice study group should be instituted consisting of members of the major rice-producing and -consuming countries of the world whose task should be to work together with the rice secretariat of the regional office in conducting a continuous study of rice production, processing, marketing, and consumption and mak-

ing recommendations through FAO for intergovernmental action wherever such may be considered necessary."

NOTE BY THE DELEGATION OF THE UNITED KINGDOM

So far as we have been able to study the matter here, we find ourselves opposed to the Indian Delegation's suggestion that a rice board be formed in Southeast Asia. Our opposition is based on the following grounds:

- (1) Rice is a world commodity and any organization set up to advise on rice, or control the allocation of the world's surplus of rice, should be a world organization and not a regional one.
- (2) The membership of the IEFC Rice Committee in Washington already ensures that the allocation of rice does not become the monopoly of one section of the countries concerned with the rice problem. The following countries are independently represented on the IEFC Rice Committee: Brazil, Burma, Canada, China, Cuba, Ecuador, Egypt, France (French Indo-China), India, Netherlands (Indonesia), Philippines, Siam, United Kingdom, and the United States of America.
- (3) The allocation of rice should be made, as far as possible, in relation to other food-stuffs especially cereals. The allocation of all other foods subject to international allocation or control is being decided in Washington; and it is right that the allocation of rice should be made there also.
- (4) The suggestion made by the Indian Delegation that a more equitable allocation would result from the transferring of the power of allocation from the IEFC Rice Committee in Washington to a rice board in Southeast Asia "consisting mainly but not wholly of all the major rice-producing and -consuming countries of the world" is, in our view, unwarranted, and its implication unacceptable. A study of the rice rations which the allocations have enabled each country to maintain during the past year should yield some evidence on this point and will be found instructive.
- (5) The suggestion that the present machinery of the IEFC Rice Committee in Washington lacks flexibility is no argument in support of the Indian Delegation's proposal to substitute for it a Rice Board in Southeast Asia. The need for "greater flexibility" was recognized by the IEFC Rice Committee in Washington when they formed a subcommittee in Southeast Asia. Under its terms of reference, this Southeast Asia subcommittee of the IEFC meets every month in Singapore, reviews the availabilities for the coming month, decides upon the monthly pro rata allotment of rice for each territory drawing upon the Southeast Asia pool, and agrees upon a shipping program. The allotment is made within the allocations already made by the parent committee in Washington. The subcommittee, in addition, has been given power to consider any "spot critical situa-

tion" that may have arisen during the month in any of the countries represented, and to suggest how to deal with it. The following territories have independent representation upon the Subcommittee: Burma, Ceylon, China, France, (French Indo-China), India, Netherlands (Indonesia), Malaya, Philippines, Siam, United Kingdom, and the United States of America.

We favor the following proposals:

- (1) that FAO headquarters be equipped with a special secretariat for rice whose task should be that of co-ordination of the work on rice done in the different sections of the FAO headquarters and in the proposed regional office in South and East Asia;
- (2) that a regional office of FAO should be constituted somewhere in South and East Asia as early as possible;
- (3) that this regional office should be equipped with a secretariat for rice, whose task should be co-ordinating and promoting the work on rice done by the regional office, keeping constant contact with the countries concerned, and collecting and disseminating all available information on rice; and
- (4) that a permanent rice study group should be instituted consisting of members of the major rice-producing and -consuming countries of the world, whose task should be to work together with the rice secretariat of the regional office in conducting a continuous study of rice production, processing, marketing, and consumption and making recommendations through FAO, or ITO as appropriate, for intergovernmental action wherever such action may be considered necessary.

STATEMENT BY THE UNITED STATES DELEGATION

In the judgment of the United States Delegation, the Rice Study Group in its deliberations discovered

no fields requiring international action in the foreseeable future aside from, broadly speaking, those of research and allocation. The United States Delegation favors the maximum use of specialized United Nations organizations to treat these problems. It believes that collection and analysis of statistical data, economic research, and the collation and dissemination of research results should be instituted on an expanded scale for rice by FAO at whatever location may prove most suitable. It believes that rice allocations, agreed by Committee III to be necessary under present conditions of extreme scarcity although undesirable in principle, should be continued by the IEFC.

The United States Delegation generally opposes the institution of international arrangements to cover ill-defined and hypothetical kinds of international action. It particularly opposes improvisation of unneeded international arrangements for rice problems since so much basic work needs to be undertaken for this commodity. Discussion of these organizational questions was required in the Study Group to enable a free exchange of views regarding the implications of various proposals for future international co-operation. It is clear, however, that recommendations regarding the jurisdiction and procedures of international organizations or related bodies lie beyond the expert competence of this Study Group.

STATEMENT BY AUSTRALIAN DELEGATION

The Australian Delegation desires to express its viewpoint as follows:

- (1) The Study Group is not competent to make recommendations on matters of international trade being dealt with at Geneva.
- (2) Australia desires to retain the present system of allocation of rice.
- (3) Australia opposes the formation of a special rice board in Southeast Asia with power to allocate and distribute supplies.

